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The PHOTOFACT Servicer

APRIL 1, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 4, No. 37

ROBERT M. ELLIS, *Editor*

COMING NEXT ISSUE

Please read this important announcement

Beginning with PHOTOFACT Set No. 38, we will bring you the most valuable help you have had for your service business since the advent of PHOTOFACT Folders.

We are not going into detail until we can give you the complete details. But this we can say—the changing aspect of servicing has presented a need, a great and growing need, the urgency of which ultimately will be felt by every technician. Others were saying that nothing could be done; but to the PHOTOFACT organization the situation was a challenge, and this challenge has been met. Though it has cost thousands of dollars and over a year of work and research, a new feature is being added to your PHOTOFACT Folders, without an extra penny of cost to you.

You cannot afford to miss an issue

Don't take a chance on a sell-out. It has happened before with PHOTOFACT Folders. Place your order with your distributor NOW for PHOTOFACT Folder Set No. 38, and succeeding issues. You will be glad you did.

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

PHOTOFACT FILING

"I have noticed that you have from time to time given several methods of filing the PHOTOFACT Folders for shop use. The system that I have had in use since I bought my first set has been as outlined below. If this method has been discussed in one of your sets I have missed it but it does have certain advantages over any method yet advanced. It has the advantage of keeping all PHOTOFACTS under the manufacturer name division in volumes.

I now have three of your hard covers and I file all Folders under alphabet line-up by manufacturers. I bought an A-Z Index at an office supply house and have divided it up into three sets, that is A—G, H—R, and S through Z for the three volumes. When I buy a PHOTOFACT Set I simply take a pair of scissors or a razor blade and slip the back of the punch-hole and open my Folder as wide as the covers will permit, then slip the individual Folders in their proper manufacturers' model number sequence. This, I know is not original, or very complex and is used in many salesbook price lists. When I need a Folder for repairs, etc., I simply loosen the covers and slip the Folder out, leaving a blotter or piece of paper as a marker. I have tried all the other methods you have suggested and find that I like this better than all others. It has the distinct advantage of putting together all manufacturers' sets. I can reach up and get the right volume without reference to any index as I have an Index Holder on the backs of my volumes that can be changed as the volumes increase in size. In adding a volume, all you have to do is remove the back section, as needed, by letters and insert in the front of the next volume. When the covers have been loosened this is easily done and requires very little time. I find that forty sets can be filed in three covers. Slitting the punch holes does not mutilate the Folder and I am attaching hereto sample showing just what I mean."

Submitted by: Mr. A. B. Fischer, P. O. Box 2820, Dallas 1, Texas

★

EDITOR'S NOTE: Mr. Fischer's contribution is welcome because it shows still another method of filing PHOTOFACT Folders. There is a system that will meet the exact needs of your shop. Most service shops have standardized on the "30-second" method. If you are undecided as to the best method for your own shop, write for your free copy of the "5-Ways To File" Folder.

★ ★

PILOT T-601 "PILOTUNER"

Photofact 4718-26, Set 28

"A few weeks ago I received a new Pilot T-601 'Pilotuner' which produced a loud objectionable hum.

On checking the filter condensers, I found them to be in good condition. After further checking, I isolated the trouble in the output stage. Replacing the 6AL5 tube eliminated the hum, although the tube tested o.k.'

Submitted by: Mr. Felix Laureckis, Laureckis Radio Service, Allen Hill Road, Brooklyn, Connecticut

★ ★

EMERSON 515

Photofact 472-11, Set 12

Photofact 4716-11, Set 26

"This set appears in Folders 472-11 and 4716-11, one difference being that one uses inductive coupling and the other capacitive (gimmick) coupling for an external antenna. Several of the latter have come into this shop with extremely high noise level and low gain in the antenna circuit.

All were cured by replacing the loop which had absorbed moisture. The r.f. coupling condenser (Part No. 20) sometimes causes fading and considerable background noise, too. Naturally, a drop in signal will appear between the r.f. plate and mixer grid under these conditions."

★

PHILCO 46-420

Photofact 466-22, Set 6

"When removing greasy fingerprints from the plastic dial in this and similar models, *don't* use carbon-tet to cut the gum. Some of the new plastics are soluble in it and the Philco dials are a notable example. If the plastic is scratched or clouded, polish with water and jeweler's rouge to restore the original luster. Use a very soft cloth as the plastic is quite soft."

★

GENERAL ELECTRIC LC-658

"This set uses a 3x20 mfd. 250v. condenser which fails occasionally with the usual symptoms. Sometimes, especially when a prong-base type is used as a replacement, the set may tend to become unstable and show i.f. oscillation but only when the tone control is in 'bass' position. This may be cured by returning the a.v.c. by-pass condenser to a point on the chassis close to the return of the filter condenser. To check, try a condenser across the a.v.c. by-pass as if checking for an open. When the return of the test condenser strikes the proper place, the oscillation will stop."

★

SHOP NOTES

"Liquid soldering flux, acetone, Quartz-Q, Ambroid and similar liquids will be more convenient if kept in bottles fitted with eye-dropper tops. Several small bottles may be kept from scattering and upsetting if placed within a frame or ring somewhat the way you rack pool balls."

★

JEWEL-POINT PHONO NEEDLES

"Jewel-point phono needles are sometimes best left with the customer when servicing combinations. Steel needles are handy and economical for shop testing but tend to spill too easily. This may be prevented by placing a small magnet among them. They may then be picked off as required with no danger of spilling."

★

INTERMITTENT HEATERS

"Intermittent heaters on series-heater circuits will show up more readily if the applied voltage is alternately raised and lowered in intervals of a few minutes. I used to raise the voltage with the idea of 'burning out' the intermittent but, too often, found that I had welded it instead. The alternate expansion and contraction brought on by the suggested method has proved much more effective. Subnormal voltages are often preferable to high voltages since less welding results."

Submitted by: Mr. Francis C. Wolven, R. F. D. No. 2, Box 178, Saugerties, New York

★ ★

TEMPLE PORTABLE G410

Photofact 4717-28, Set 27

"Complaint: Severe distortion on loud volume when battery operated; o.k. on a.c.

"I noticed the leads to the battery plug had been resoldered. On checking the connections against those in the PHOTOFACT Folder, I discovered that the 'A' leads had been reversed. Changing these wires to the correct polarity corrected the trouble."

Submitted by: Mr. Wayne Schwab, Mars, Pennsylvania

★ ★

PHILCO "BEAM OF LIGHT" PICKUP

"I recently serviced a Philco Model 41-808, Code 122, on which the complaint was very low volume on the phono. I finally decided that the exciter light in the 'Beam of Light' playing head was not as bright as it should be. I tried a battery source to provide the proper voltage and the volume came up to normal. The filament of the lamp is normally lighted by the oscillator in the receiver which has a separate winding for this purpose. Using a vacuum tube type a.c. voltmeter I found that the voltage at the terminals of this coil was much higher than the voltage appearing at the terminals of the transmission line at the rear of the set. I further found that by tuning this transmission line it could be made to draw current from this coil and consequently the voltage appearing at the socket of the exciter lamp came up to the rating of the bulb (3.4 volts). I tried a large capacity trimmer condenser in combination with various fixed micas until I found the capacity which produced optimum results. In this case .006 mfd. did the job but this might vary with different sets. No service men with whom I discussed this problem had ever learned the remedy. One man told me, 'Those things are no good—I always replace them with a crystal pickup.' Nevertheless the answer is simple when one knows it."

Submitted by: Mr. Paul E. Frost, R. F. D. No. 11, Penacook, New Hampshire

★ ★

OLYMPIC 6-617

Photofact 464-7, Set 4

"Complaint: Intermittent buzzing on low musical notes.

The voice coil leads on this set are short and quite rigid and one was frayed at the cone end. To remedy, use a high grade braided lead and leave a ¼" sag between connections."

★

TRAV-LER 5019

Photofact 4713-30, Set 23

"Dead or intermittent operation.

The 220 K ohm resistor, Item 16, is grounded to the rivet holding the No. 1 tube socket to the chassis. This may be a bad ground point. To remedy, solder the strip under the rivet directly to chassis for a positive ground connection."

Submitted by: Mr. A. L. Wagy, A-C Radio & Appliance, 143 West 103rd Street, Chicago 28, Illinois

★ ★

WESTINGHOUSE H-165

Photofact 482-30, Set 32

"I have had two Model H-165 Westinghouse battery-line operated portables come in for repairs, both of which were said to be intermittent on the line or a.c.

All component parts checked o.k., but it was found that with a drop in line potential of 8 volts, the set would quit.

Upon changing the selenium rectifiers, the sets operated perfectly."

Submitted by: Al's Radio Service, 100 East 65th Street, Seattle 5, Washington

★ ★

PHILCO 47-1227

Photofact 4715-22, Set 25

"The complaint, excessive distortion on the FM Band, was traced to the secondary of the third i.f. transformer being open from the center-tap to pin No. 5 of the 7X7 tube. I have had three sets of this model with the same trouble.

A quick check can be made with an ohmmeter. The resistance from pin No. 5 to pin No. 7 of the 7X7 tube socket should check one ohm. Be sure the new replacement i.f. transformer shows this one ohm resistance between the yellow and green leads."

Submitted by: Mr. Val Banes, Banes Radio Repair, 121 North Hill, Siloam Springs, Arkansas

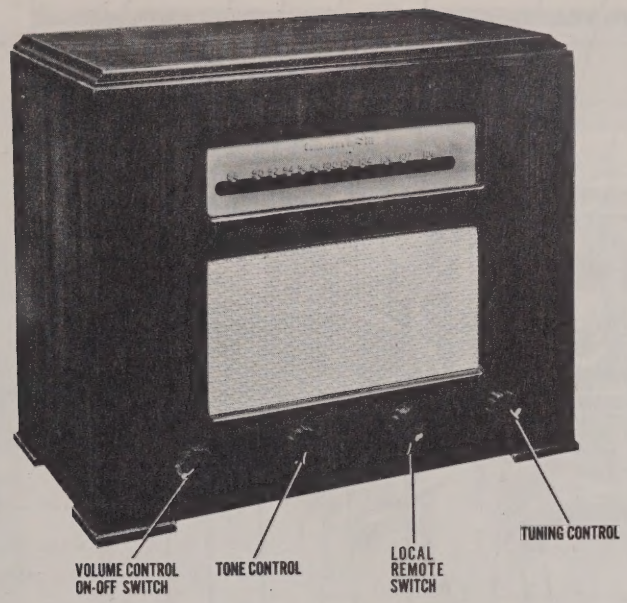
PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 4—Set No. 38 ..... **April 16**
Volume 4—Set No. 39 ..... **May 15**
Volume 4—Set No. 40 ..... **May 15**
Volume 5—Set No. 41 ..... **July 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

AIRADIO MODEL
3100



AIRADIO MODEL 3100

TRADE NAME	Airadio, Model 3100
MANUFACTURER	Airadio, Inc., Stamford, Conn.
TYPE SET	AC-DC operated FM Receiver
TUBES (Eight)	Types 12BA6 RF Amp., 12BE6 Converter, 6BJ6 1st IF Amp., 6BJ6 2nd IF Amp., 12BA6 3rd IF Amp., 12AL5 Ratio Det., 6AQ6 AF Amp., 50B5 Power Output.
POWER SUPPLY	110-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—	Freq. Mod. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning capacitor fully open and set pointer to reference dot at end of dial.

Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal 450KC sweep with 60∿ modulation. Use 120∿ sawtooth voltage in scope for horizontal deflection

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (Grid) 6BJ6 2nd IF Tube (4). Low side to Chassis.	10.7 MC (Freq. Mod.)	Tuning cap. fully open.	Vertical Input to Point (A). Ground to Chassis.	A1, A2 A3	Remove 8 MFD. cap. from Point A. Adjust A1, A2 & A3 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
2	.01 MFD	High side to Pin 1 (Grid) 6BJ6 1st IF Tube (3). Low side to Chassis.	10.7 MC (Freq. Mod.)	Tuning cap. fully open.	Vertical Input to Point (A). Ground to Chassis.	A4,A5	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig.1.
3	.01 MFD	Disconnect 5Ω resistor (49) from pin 7 12BE6. Connect 100KΩ resistor from 7 to Chassis. High side to pin 7. Low side to Chassis.	10.7 MC (Freq. Mod.)	Tuning cap. fully open.	Vertical Input to Point (A). Ground to Chassis.	A6,A7	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig.1.
4	.01 MFD	Remove 100KΩ resistor and reconnect 5Ω resistor. High side to Pin 1 (Grid) 6BJ6 2nd IF Tube (4). Low side to Chassis.	10.7 MC (Freq. Mod.)	Tuning cap. fully open.	Vertical Input to Point (B). Ground to Chassis.	A8	Reconnect 8 MFD cap. to Point A. Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig.2. Continue with RF alignment Step 6.

FOR RF ALIGNMENT AND ALTERNATE IF ALIGNMENT SEE PAGE 4

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		AIRADIO PART No.	STANDARD REPLACEMENT		
1	RF Amp.	12BA6	12BA6	7BK	
2	Converter	12BE6	12BE6	7CH	
3	1st IF Amp.	6BJ6	6BJ6	7CM	
4	2nd IF Amp.	6BJ6	6BJ6	7CM	
5	3rd IF Amp.	12BA6	12BA6	7BK	
6	Ratio Det.	12AL5	12AL5	6BT	
7	AF Amp.	6AQ6	6AQ6	7BT	
8	Power Output	50B5	50B5	7BZ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

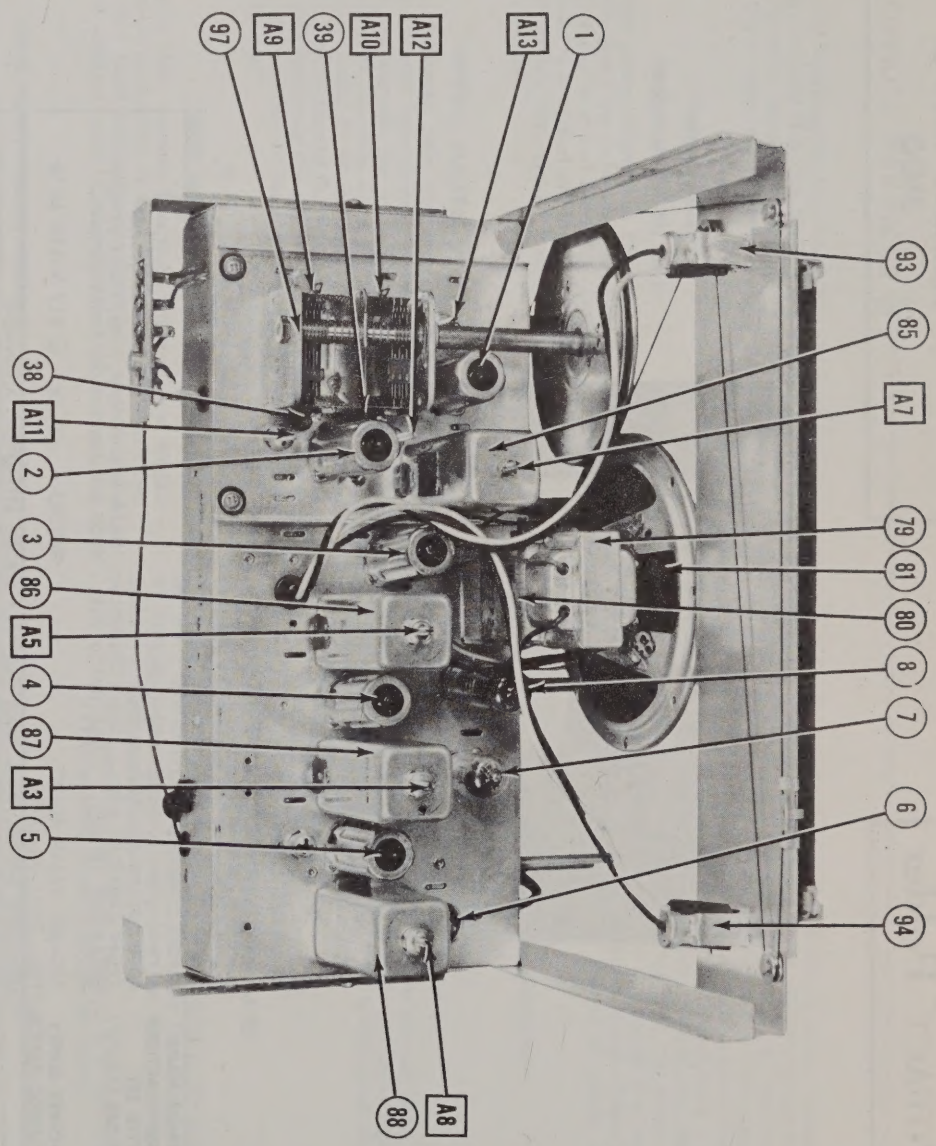
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	AIRADIO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
9	30	150	CD1253	UT-301	PRS 150-30	BR3015	M-30-150	Filter
10A	40	150	CD1226-1	TA-430	PSRA 150-30	EDL4415	DSB-2x40-	Filter - Red
B	30	150			40		150	Filter - Green
11	30	150	CD1253	UT-301	PRS150-30	BR3015	M-30-150	Filter
12	10	25	CD1224	TA-10	PRS25-10	BR102A	M-10-25	Cathode Bypass
13	8	150	CD1252	UT-81	PRS150-8	BR815	M-8-150	Stabilizing Cap
14	50	25	CD1261	TA-50	PRS25-50	BR502	M-50-25	Surge Limiter
15	.0015	400	CD1227-2	TC-22	484-002	DT6D2	ST-6-002	Line Filter
16	.01	400	CD1255-112	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
17	.02	400	CD1255-114	TC-12	484-02	DT4S2	ST-4-02	Audio Coupling
18	.003	400	CD1255-106	TC-23	484-003	DT6D3	ST-6-003	Audio Coupling
19	.02	400	CD1255-114	TC-12	484-02	DT4S2	ST-4-02	Tone Comp.
20	.02	400	CD1255-114	TC-12	484-02	DT4S2	ST-4-02	Audio Coupling
21	.003	400	CD1255-106	TC-23	484-003	DT6D3	ST-6-003	De-emphasis
22	.01	400	CD1255-112	TC-11	484-01	DT4S1	ST-4-01	3rd IF Decoupling
23	.01	400	CD1255-112	TC-11	484-01	DT4S1	ST-4-01	1st IF Decoupling
24	.1	150	CD1255-21	TC-1	484-.1	DT2P1	ST-2-1	AVC Filter
25	.05	400	CD1255-117	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
26	90	500	CD1107-100	1FM-31	1468-0001	5W5T1	MO.5-31	Fil. Bypass - Cer.
27	50	500	CD1254-2	1FM-45	1468-00005	5W5Q5	MO.5-45	Fil. Bypass - Cer.
28	50	500	CD1254-2	1FM-45	1468-00005	5W5Q5	MO.5-45	Fil. Bypass - Cer.
29	5000	350	CD1259-60	1FM-25	1467-005	1D5D5	MW.5-25	Fil. Bypass - Cer.
30	5000	350	CD1259-60	1FM-25	1467-005	1D5D5	MW.5-25	Tone Comp. -Cer.
31	1000	500	CD1071-25	1FM-21	1467-001	1W5D1	MO.3-21	AVC Filter
32	330	350	CD1259-40	1FM-335	1468-00035	5W5T3	MO.5-33	Diode Load Cap.-Cer.
33	330	350	CD1259-40	1FM-335	1468-00035	5W5T3	MO.5-33	Diode Load Cap.-Cer.
34	330	350	CD1259-40	1FM-335	1468-00035	5W5T3	MO.5-33	RF Bypass - Cer.
35	10	500	CD1254-1	1FM-41	1468-00001	5W5Q1	MO.5-41	RF Bypass Pwr. Supply-Cer
36	330	350	CD1259-40	1FM-335	1468-00035	5W5T3	MO.5-33	Conv. Screen Bypass - Cer
37	50	500	CD1106-110	1FM-45	1468-00005	5W5Q5	MO.5-45	OSC Grid Cap. - Cer.
38	50	500	CD1106-110	1FM-45	1468-00005	5W5Q5	MO.5-45	Fixed Pad - Cer.
39	90	500	CD1107-100	1FM-31	1468-0001	5W5T1	MO.5-31	Fixed Pad - Cer.
40	50	500	CD1254-2	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling - Cer.
41	1500	400	CD1227-2	1FM-215	1467-0015	1W5D15	MW.5-215	RF Screen Bypass - Cer.
42	100	500	CD1071-22	1FM-31	1468-0001	5W5T1	MO.5-31	RF Cathode Bypass
43	2000	500	CD1073-5	1FM-22	1467-002	1W5D2	MW.5-22	RF Bypass
44	100	500	CD1071-22	1FM-31	1468-0001	5W5T1	MO.5-31	Line Ant. Coupling
98	.01	400	CD1255-112	TC-11	484-01	DT4S1	ST-4-01	2nd IF Decoupling

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	AIRADIO PART No.	IRC PART No.	CLAROSTAT PART No.	
45A	500KΩ	½	RE-1181	D18-133X	T-88	Volume control tapped @ 40KΩ#
B	Shaft		Not Req.	A	Not Req.	Attach to 45A per instructions.
C	Switch		Not Req.	41	SW-A	Attach to 45A per instructions.
46A	250KΩ	½	RE-1182	D13-130	M-64-Z	Tone control.#
B	Shaft		Not Req.	A	Not Req.	Attach to 46A per instructions.

#Use original insulating washers to isolate control from chassis.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRADIO PART No.	IRC PART No.	
47	120Ω	½	RE-1062-124		Br.-Red-Br.-RF Cathode
48	150Ω	½	RE-1139-154		Br.-Gr.-Br. RF Decoupling
49	5Ω	½	RE-1189		Blk.-Grn.-Blk. Parasitic Suppressor
50	22KΩ	½	RE-1139-226	BTS-22K	Red-Red-Or. Oscillator Grid
51	120Ω	½	RE-1062-124		Br.-Red-Br. Converter Decoupling
52	68Ω	½	RE-1139-683		Blue-Gray-Blk. 1st IF Cathode
53	1000Ω	½	RE-1139-105	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
54	82Ω	½	RE-1062-823		Gray-Red-Blk. 2nd IF Cathode
55	1000Ω	½	RE-1139-105	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
56	120Ω	½	RE-1062-124		Br.-Red-Br. 3rd IF Cathode
57	1000Ω	½	RE-1139-105	BTS-1000	Br.-Blk.-Red 3rd IF Decoupling
58	47Ω	½	RE-1139-473		Yl.-Vi.-Blk. Balancing Resistor
59	15KΩ	½	RE-1139-156	BTS-15K	Br.-Grn.-Or. De-emphasis
60	1000Ω	½	RE-1139-105	BTS-1000	Br.-Blk.-Red Balancing Resistor
61	680Ω	½	RE-1130-684	BTS-680	Blue-Gray-Br. Balancing Resistor
62	6800Ω	½	RE-1015-685	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
63	6800Ω	½	RE-1015-685	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
64	1 Meg.	½	RE-1139-108	BTS-1 Meg.	Br.-Blk.-Gr. AVC Network
65	47KΩ	½	RE-1139-476	BTS-47K	Yl.-Vi.-Or. AVC Network
66	470KΩ	½	RE-1139-477	BTS-470K	Yl.-Vi.-Yl. AVC Network
67	15KΩ	½	RE-1139-156	BTS-15K	Br.-Grn.-Or. Tone Compensation
68	10 Meg.	½	RE-1139-109	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
69	220KΩ	½	RE-1139-227	BTS-22K	Red-Red-Or. AF Plate Load
70	150Ω	½	RE-1139-154	BW-½-150	Br.-Grn.-Br. Output Cathode
71	10Ω	½	RE-1139-103	BW-½-10	Br.-Blk.-Blk. Output Transformer Shunt
72	10Ω	½	RE-1139-103	BW-½-10	Br.-Blk.-Blk Output Transformer Shunt
73	680Ω	½	RE-1130-684	BTS-680	Blue-Gray-Br. Filter
74	330Ω	1	RE-1153-334	BW-1-330	Or.-Or.-Br. Filter
75	100Ω	3	RE-1187-2	AB-100	Br.-Blk.-Br. Filter
76	15Ω	1	RE-1153-153	BW-1-15	Br.-Grn.-Br. Surge Limiter
77	50Ω	2	RE-1187-1	BW-2-47	Grn.-Blk.-Blk. Pilot Light Shunt
78	50Ω	2	RE-1187-1	BW-2-47	Grn.-Blk.-Blk. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRADIO PART No.	STANCOR PART No.	THORDAR'N PART No.		
	PRI.	SEC.	PRI.	SEC.					
79	2400Ω	3.2Ω	200Ω	.6Ω	Part of SK-1011	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

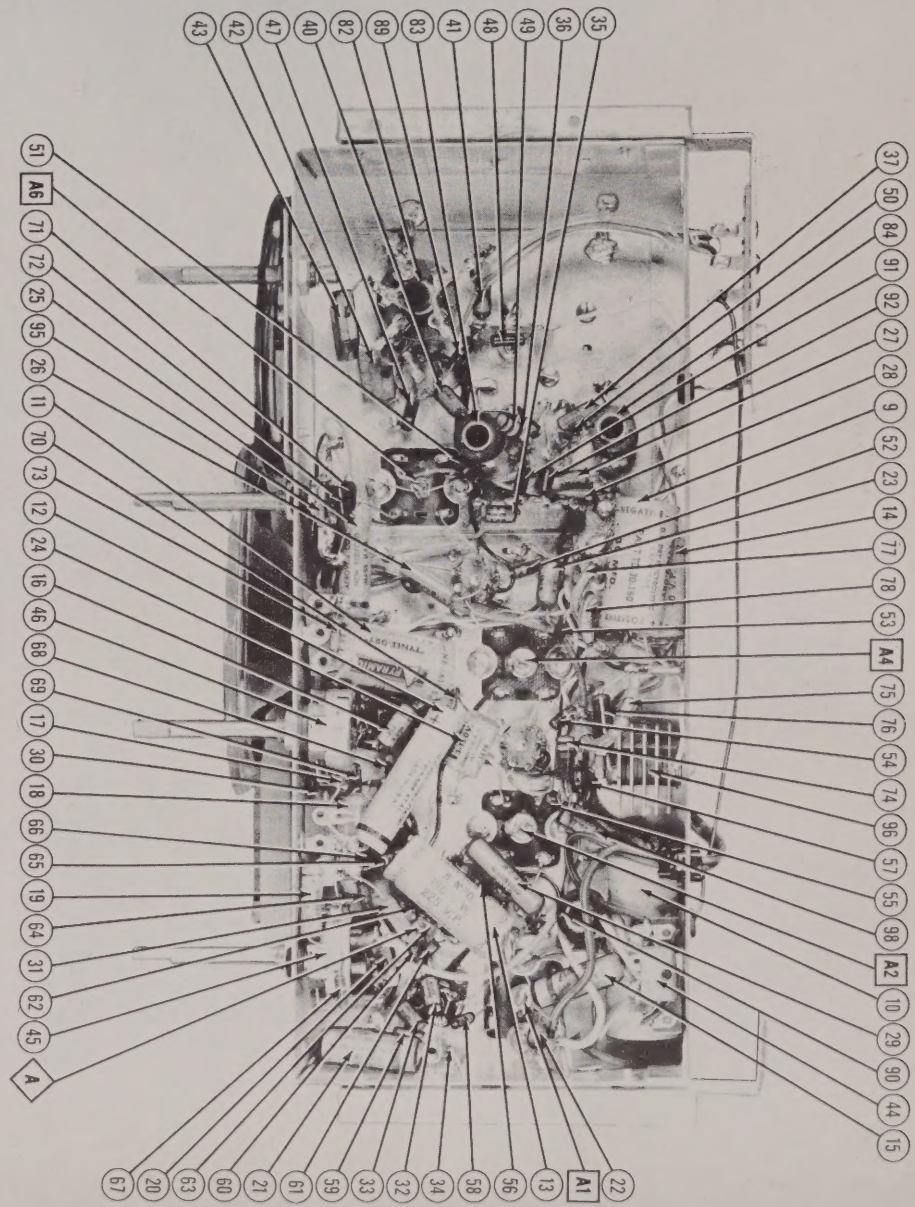
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRADIO PART No.	JENSEN PART No.	QUAM PART No.	
80	FIELD PM	VC IMP. 3.2Ω	SK-1011	ST-105† Mod. P5-X	5A07†	†Use wood spacers to duplicate original mounting.
81	CONE DIA. 4¾"	VC DIA. 1"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIRADIO PART No.	MEISSNER PART No.
82	FM Ant.Coil	.1Ω	.1Ω	TR-1064	
83	FM RF Coil		.1Ω	AS-3767-1	
84	FM OSC Coil		0Ω	AS-3767-2	
85	FM Input IF	.2Ω	.2Ω	TR-1065	
86	FM Inter IF	.2Ω	.2Ω	TR-1065	
87	FM Output IF	.2Ω	.2Ω	TR-1065	
88	FM Ratio Det.	.6Ω	.1Ω	TR-1066	
89	Plate Choke		.8Ω	CK-1041	
90	RF Choke	.1Ω	.1Ω	AS-3793	
91	Fil. Choke		.8Ω	CK-1041	
92	Fil. Choke		.8Ω	CK-1041	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA AIRADIO PART No.		INSTALLATION NOTES
93	Bayonet	6-8	0.15A	Brown	LA-1014-32		Type 47
94	Bayonet	6-8	0.15A	Brown	LA-1014-32		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	AIRADIO PART No.	NOTES
95	Switch	SW-1070	Local-Remote
96	Rectifier	RT-1013	Selenium
97	2 Gang Var.Cap	CDC-4008	

FIG. 1

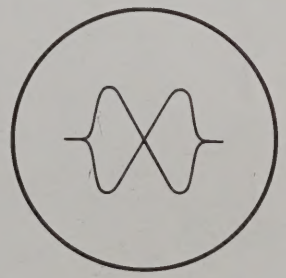


FIG. 2

FOR VISUAL IF ALIGNMENT SEE FRONT PAGE

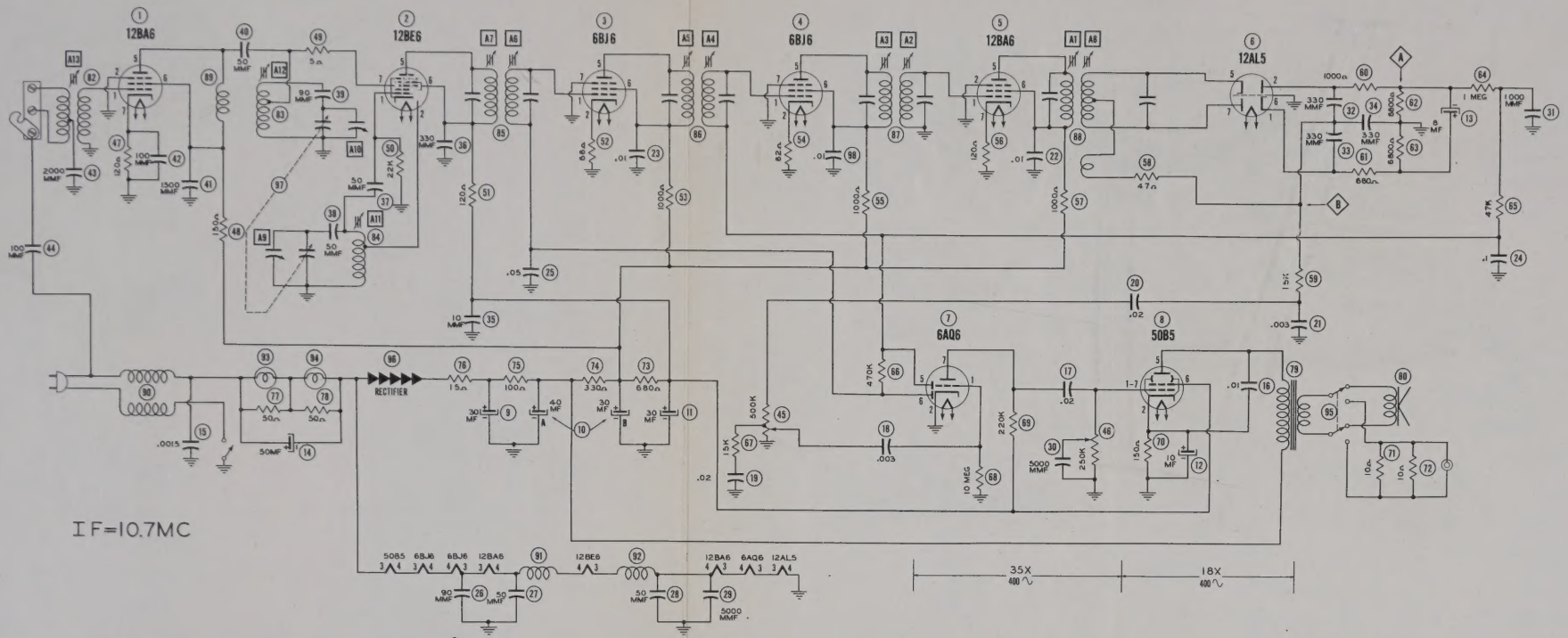
IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

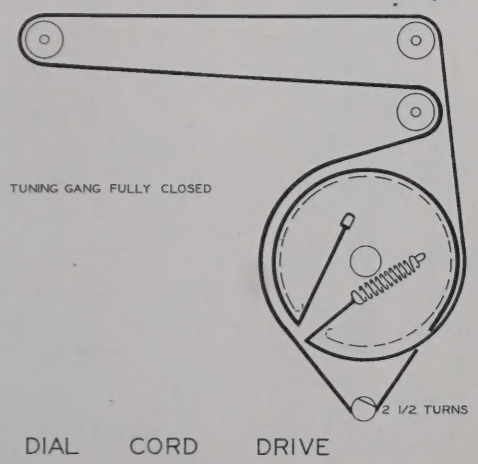
If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD	High side to Pin 1 (Grid) 12BA6 3rd IF Tube (5). Low side to Chassis.	10.7 MC (Unmodulated)	Tuning cap. fully open.	DC Probe to Point (A). Common to Chassis.	A1	Adjust for maximum deflection.
2	.01 MFD	High side to Pin 1 (Grid) 6BJ6 2nd IF Tube (4). Low side to Chassis.	10.7 MC (unmodulated)	Tuning cap. fully open.	DC Probe to Point (A). Common to Chassis.	A2,A3	Adjust for maximum deflection.
3	.01 MFD	High side to Pin 1 (Grid) 6BJ6 1st IF Tube (3). Low side to Chassis.	10.7 MC (Unmodulated)	Tuning cap. fully open.	DC Probe to Point (A). Common to Chassis.	A4,A5	Adjust for maximum deflection.
4	.01 MFD	High side to Pin 7 (Grid) 12BE6. Low side to Chassis.	10.7 MC (Unmodulated)	Tuning cap. fully open.	DC Probe to Point (A). Common to Chassis.	A6,A7	Adjust for maximum deflection.
5	.01 MFD	High side to Pin 1 (Grid) 12BA6 3rd IF Tube (5). Low side to Chassis.	10.7 MC (Unmodulated)	Tuning cap. fully open.	DC Probe to Point (A). Common to Chassis.	A8	Adjust for zero deflection. Repeat steps 1 & 5 until no further improvement can be made making A8 last adjustment for zero deflection. Continue with RF alignment Step 6.

RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	2 150Ω carbon resistors	150Ω resistor in series with each generator lead to Dipole Terminals.	106 MC (Unmodulated)	106 MC	DC Probe to Point (A). Common to Chassis.	A9,A10	Adjust for maximum deflection.
7	2 150Ω carbon resistors	150Ω resistor in series with each generator lead to Dipole Terminals.	92 MC	92 MC	DC Probe to Point (A). Common to Chassis.	A11, A12	Adjust for maximum deflection. Repeat steps 5 & 6 until no further improvement can be made.
8	2 150Ω carbon resistors	150Ω resistor in series with each generator lead to Dipole Terminals.	99MC	Tune for maximum deflection	DC Probe to Point (A). Common to Chassis.	A13	Adjust for maximum deflection.





DIAL CORD DRIVE

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BA6	0V.	0V.	52VAC	40VAC	92VDC	92VDC	1.3VDC
2	12BE6	-4VDC§	0V.	29VAC	40VAC	87VDC	87VDC	0V.
3	6BJ6	-.4VDC	.3VDC	52VAC	57VAC	87VDC	87VDC	0V.
4	6BJ6	-.4VDC	.5VDC	62VAC	57VAC	87VDC	87VDC	0V.
5	12BA6	0V.	0V.	17VAC	29VAC	87VDC	87VDC	1.4VDC
6	12AL5	.8VDC	-.8VDC	11VAC	0V.	0V.	0V.	0V.
7	6AQ6	-.4VDC	0V.	11VAC	17VAC	-.5VDC	-.5VDC	-43VDC
8	50B5	0V.	5.9VDC	110VAC	62VAC	105VDC	87VDC	0V.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BA6	.1Ω	0Ω	54Ω	42Ω	50KΩ	50KΩ	120Ω
2	12BE6	22KΩ	0Ω	30Ω	42Ω	50KΩ	50KΩ	5Ω
3	6BJ6	1.6 Meg.	68Ω	54Ω	60Ω	50KΩ	50KΩ	0Ω
4	6BJ6	1.1 Meg.	85Ω	68Ω	60Ω	50KΩ	50KΩ	0Ω
5	12BA6	.2Ω	0Ω	19Ω	30Ω	50KΩ	50KΩ	125Ω
6	12AL5	7KΩ	7KΩ	12.5Ω	0Ω	INF.	0Ω	INF.
7	6AQ6	10 Meg.	0Ω	12.5Ω	19Ω	1.1 Meg.	1.6 Meg.	270KΩ
8	50B5	270KΩ	150Ω	115Ω	68Ω	50KΩ	50KΩ	270KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

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THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

APEX INDUSTRIES
MODEL 4B5

APEX INDUSTRIES
MODEL 4B5

APEX INDUSTRIES MODEL 4B5

TRADE NAME	Apex Industries, Model 4B5
SUPPLIER	Apex Industries, 192 Lexington Ave., New York 16, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .230 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2,	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1700KC	1700KC	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A4	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

APEX INDUSTRIES
MODEL 4B5

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: APEX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: APEX PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	3-3	TA-240	PRSA150-40-20	EZ4215C‡	DSB-2x40-150	Filter - Red
B	20	150						" - Blue
7	.1	600		TC-1	684-.1	DT6P1	MPH-6-1	Line Filter
8	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.01	400		TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.01	400		TC-11	484-01	DT4S1	ST-4-01	" "
11	.05	600		TC-15	684-05	DT6S5	ST-6-05	AVC Filter
12	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
13	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	IF Coupling
14	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter
15	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid

‡Do not use bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: APEX PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	20-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

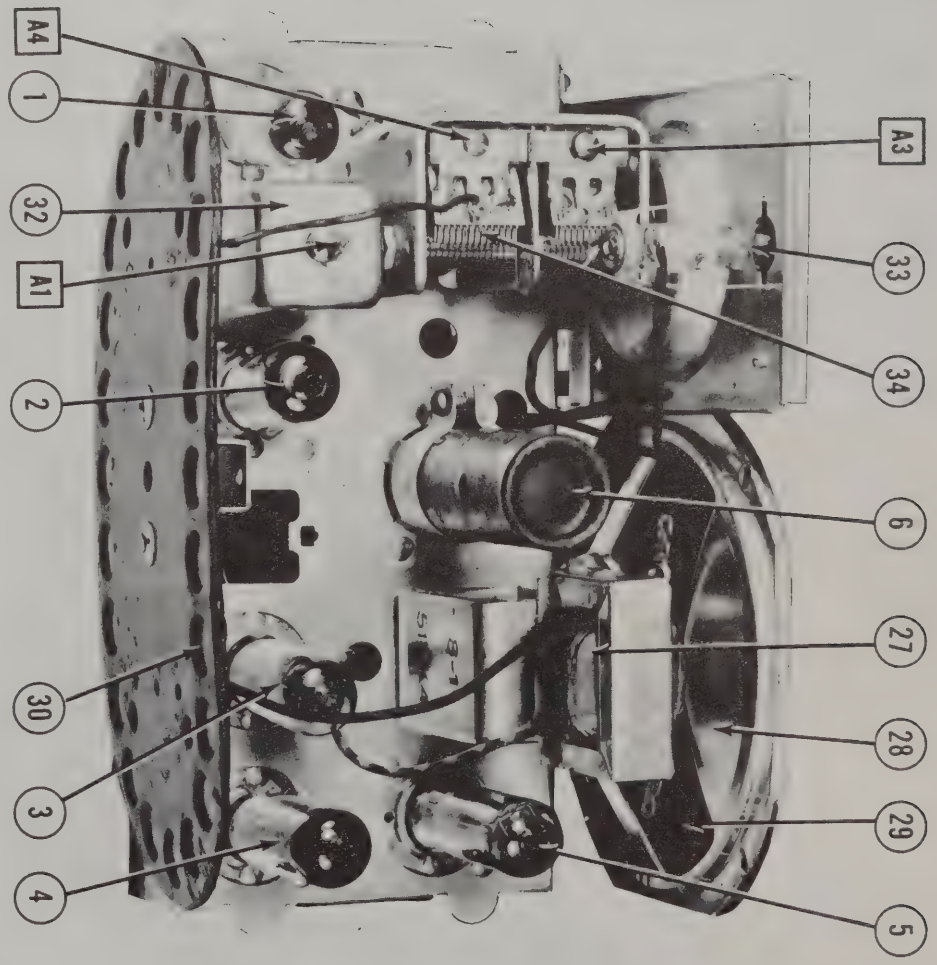
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: APEX PART No.	IRC PART No.	IDENTIFICATION CODES
17	10KΩ	½		BTS-10K	Br.-Blk.-Or. Oscillator Grid
18	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. AVC Network
19	7000Ω	½		BTS-6800	Vi.-Blk.-Red IF Plate Load
20	50KΩ	½		BTS-47K	Grn.-Blk.-Or. Diode RF Filter
21	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
22	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. AF Plate Load
23	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Output Grid
24	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
25	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
26	10Ω	½		BW-½-10	Br.-Blk.-Blk. Line Dropping

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: APEX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
27	2100Ω	3.0Ω	170Ω	.5Ω		A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA APEX PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-107†		†Drill and tap magnet frame.
28	PM	3.0Ω	S-1	Mod. P5-V	-Ale§	§Drill new mounting holes.
	CONE DIA.	VC DIA.				
29	4½"	1/2"				

R F COILS

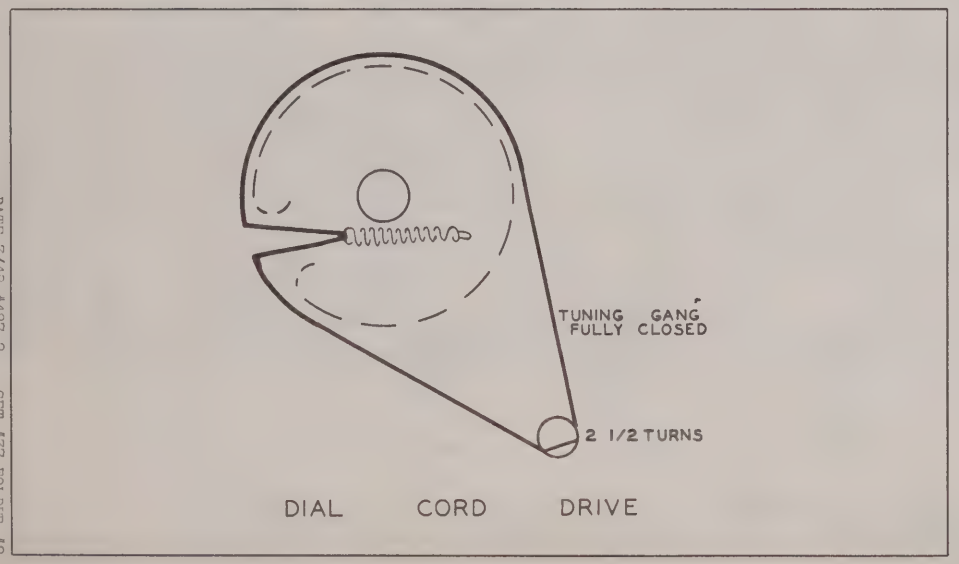
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA APEX PART No.	REPLACEMENT DATA MEISSNER PART No.
30	Loop Ant.		2.8Ω	32-5A	
31	Osc. Coil	1Ω	5.5Ω		14-1040
32	Input IF	21Ω	21Ω	15-4	16-6666

DIAL LIGHT

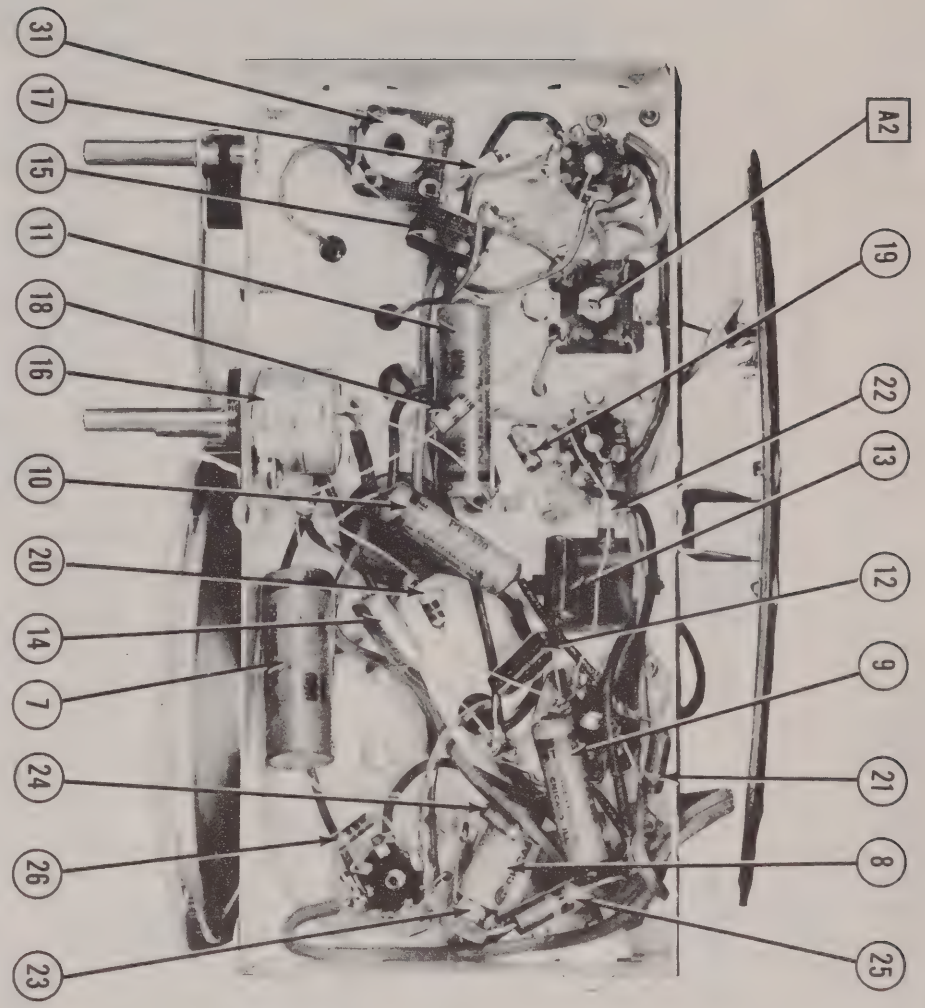
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA APEX PART No.		INSTALLATION NOTES
33	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	APEX PART No.	NOTES
34	2 Gang Var. Cap.	6-1A	25-474 MMF, 33-191 MMF

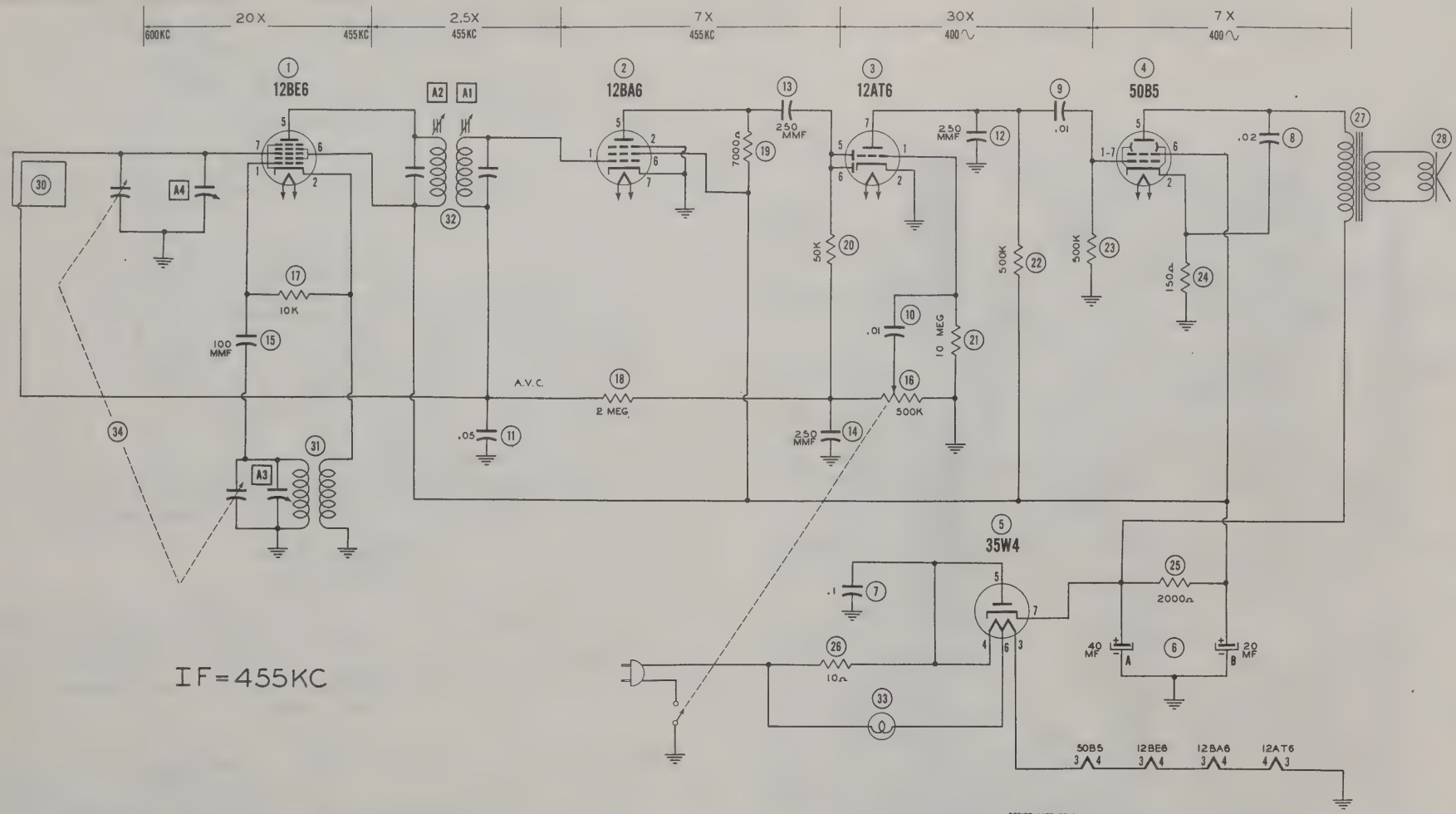


CHASSIS—BOTTOM VIEW



APEX INDUSTRIES MODEL 486

APEX INDUSTRIES MODEL 486



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-0.7VDC	0V.	36VAC	25VAC	85VDC	85VDC	-.6VDC
2	12BA6	-.6VDC	0V.	25VAC	12VAC	48VDC	85VDC	0V.
3	12AT6	-.6VDC	0V.	0V.	12VAC	-.6VDC	-.6VDC	43VDC
4	50B5	0V.	5.8VDC	90VAC	38VAC	120VDC	85VDC	0V.
5	35W4	117VAC	0V.	90VAC	116VAC	116VAC	115VAC	126VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	10KΩ	1Ω	38Ω	26Ω	80KΩ	80KΩ	3 Meg.
2	12BA6	3 Meg.	0Ω	26Ω	13Ω	87KΩ	80KΩ	0Ω
3	12AT6	10 Meg.	0Ω	0Ω	13Ω	540KΩ	540KΩ	580KΩ
4	50B5	500KΩ	150Ω	90Ω	38Ω	80KΩ	80KΩ	500KΩ
5	35W4	120Ω	INF.	90Ω	123Ω	123Ω	118Ω	301Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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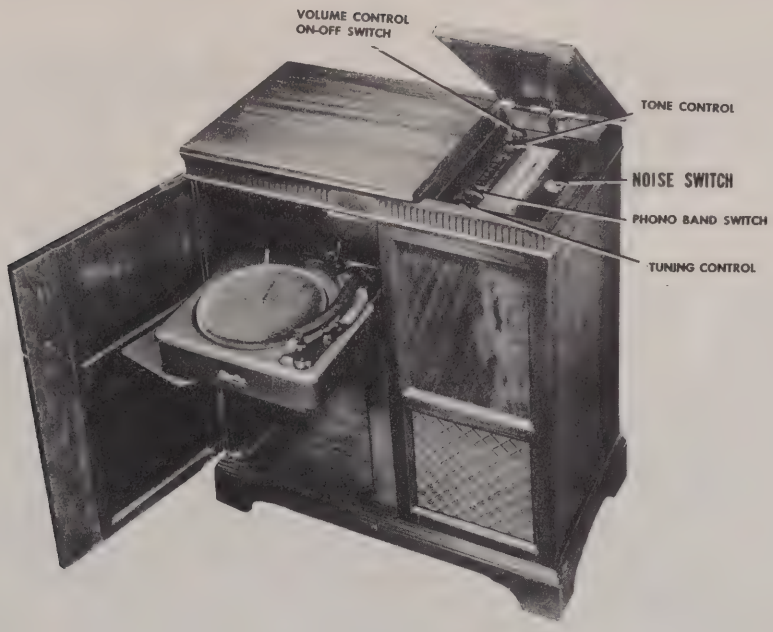
487-2

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



BENDIX MODEL 1524

TRADE NAME	Bendix, Models 1518, 1519, 1524, 1525
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Md.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Ant.
TUBES (TEN)	Types, 6AG5 FM RF Amp., 7F8 Converter, 7AH7 1st IF Amp., 7AG7 2nd IF Amp., 6H6 Ratio Det., 6AQ6 Phono Pre-Amp., 6BA6 Reactance Tube, 6SQ7 AM Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .55 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Calibration marks on botton edge of dial backplate frame are as follows (reading from left to right): end limit, 580KC, 90KC, 97MC, 965KC, 106MC and 1475KC.

To set pointer turn tuning cap. fully closed and set pointer to end limit mark.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to rear "AM" stator of tuning cap. Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4, A5,A6.	Adjust for maximum output.
2	Connect 7.2 micro-henry choke from blk. wire to white wire on loop ant. socket.	High side through .01 MFD. cap. to white wire of ant. loop socket. Low side to chassis.	580KC	"	580KC reference mark at low freq. end of dial.	"	A7	" " " "
3	"	"	1475KC	"	1475KC reference mark at high freq end of dial.	"	A8,A9.	" " " "
4	"	"	580KC	"	Tune for maximum output.	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3 and 4 until no further increase in output can be obtained.
5	"	"	965KC	"	"	"		Check calibration.
6	"	"	580KC	"	"	"		Check calibration. If calibration is not within 10KC oscillator and ant. gang rotors must be bent.

FOR FM ALIGNMENT SEE REAR PAGE OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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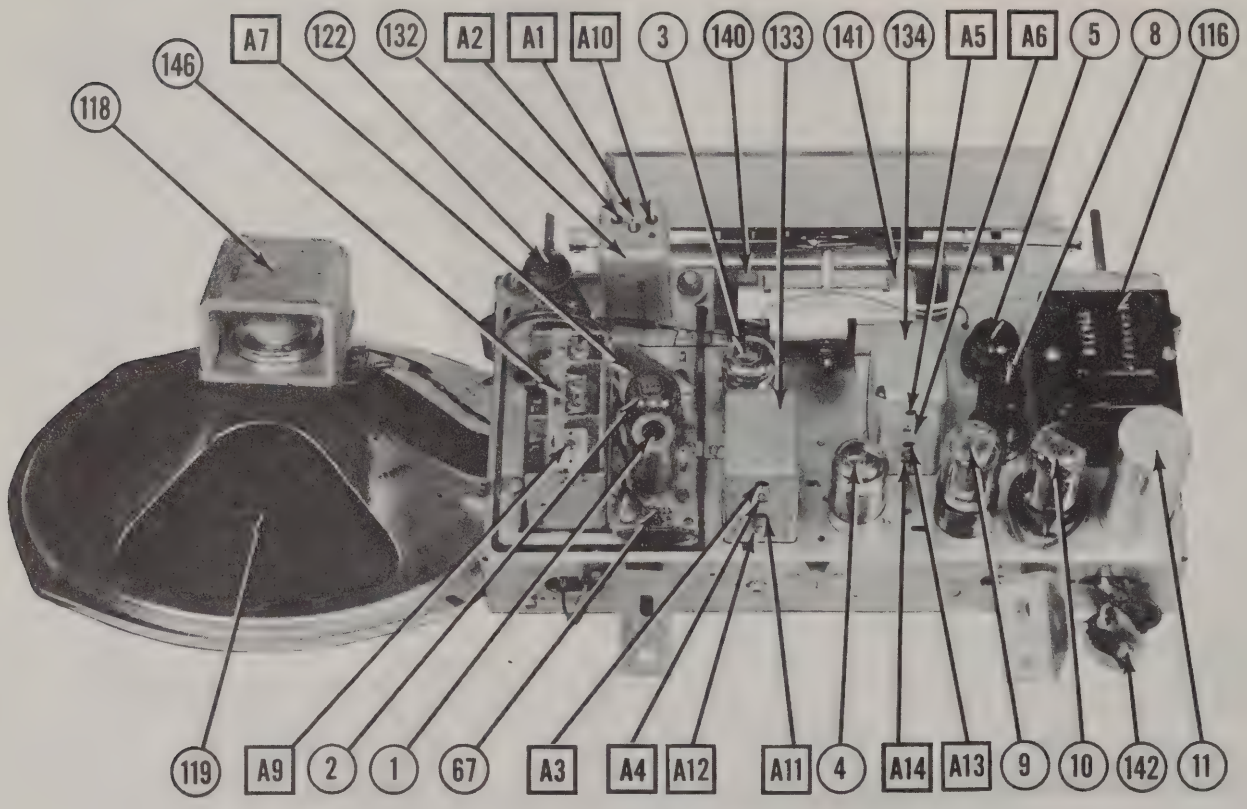
BENDIX MODELS 1518, 1519, 1524, 1525

BENDIX MODELS 1518, 1519, 1524, 1525 PAGE 1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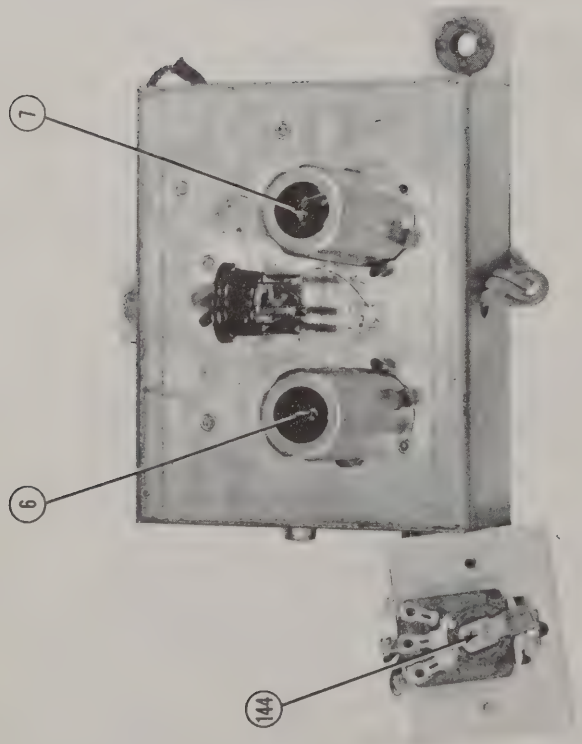
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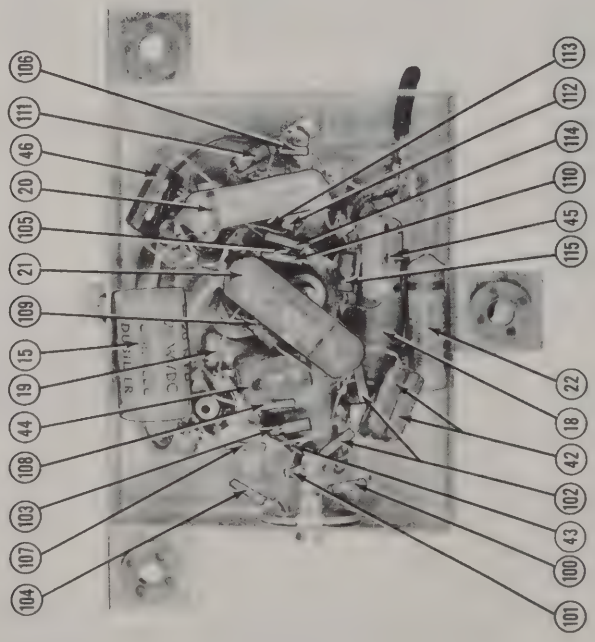
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A
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B10
B9
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B8
B7
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B5
B6
B3
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B4
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B1
B2
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A15
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A8
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A16
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A17
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6AG5	6AG5	7BD	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	7AH7	7AH7		
4	2nd IF Amp.	7AG7	7AG7		
5	Ratio Detector	6H6	6H6	7Q	
6	Phono Pre-amp.	6AQ6	6AQ6	7BT	Used in models 1524 & 1525 only.
7	Reactance Tube	6BA6	6BA6	7BK	Used in models 1524 & 1525 only.
8	AM Det.-AVC-AF	6SQ7	6SQ7	8Q	
9	Power Output	6V6GT	6V6GT	7AC	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BENDIX PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11A	20	450	CE3A03	EL-420*	AF4444J*	UP222245*	DY-4X20-450*	■ Filter
B	40	450						▲ Filter
C	20	450						● Filter
12	25	25	CE1T00	TA-25	PRS25-25	BR252A	M-25-25	Decoupling Filter
13	3	50	CE1T01	UT-41	PRS150-4	BR415	M-4-450	Stabilizing Cap.
14	25	25	CE1T00	TA-25	PRS25-25	BR252A	M-25-25	Cathode Bypass
15	20	25		TA-25	PRS25-25	BR202A	M-25-25	" " - See Note
16	.005	600	CP6T18	TC-25	684-005	DT6D5	MPH-6-005	Line Filter
17	.005	600	CP6T18	TC-25	684-005	DT6D5	MPH-6-005	" "
18	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	Plate Decoupling-See Note
19	.002	600	CP6T12	TC-22	684-002	DT6D2	ST-6-002	Audio Coupling -See Note
20	.006	400	CP4T20	TC-26	484-006	DT6D6	ST-4-006	" " -See Note
21	.03	400	CP4T36	TC-13	484-03	DT4S3	ST-6-03	Screen Bypass-See Note
22	.006	400	CP4T20	TC-26	484-006	DT6D6	ST-6-006	Bias Filter - See Note
23	.006	600	CP6T20	TC-26	684-006	DT6D6	ST-6-006	Output Plate Bypass
24	.006	600	CP6T20	TC-26	684-006	DT6D6	ST-6-006	Audio Coupling
25	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	AF Plate Decoupling
26	.01	400	CP4T31	TC-11	484-01	DT4S1	ST-4-01	Tone Comp.
27	.002	600	CP6T12	TC-22	684-002	DT6D2	ST-6-002	" "
28	.03	200	CP2T36	TC-13	484-03	DT4S3	ST-6-03	Audio Coupling
29	.006	600	CP6T20	TC-26	684-006	DT6D6	ST-6-006	" "
30	.001	200	CP2M10	TC-21	484-001	DT6D1	ST-6-001	RF Bypass
31	.001	200	CP2M10	TC-21	484-001	DT6D1	ST-6-001	Diode Load Cap.
32	.001	200	CP2M10	TC-21	484-001	DT6D1	ST-6-001	" " "
33	.001	200	CP2M10	TC-21	484-001	DT6D1	ST-6-001	RF Filter
34	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	2nd IF Decoupling
35	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	RF Bypass Power Supply
36	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	2ndIF Cathode Bypass
37	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	1st IF Decoupling
38	.01	600	CP6T31	TC-11	684-01	DT6S1	ST-6-01	AVC Filter
39	.02	400	CP4M34	TC-12	484-02	DT4S2	ST-4-02	" "
40	.05	400	CP4T40	TC-15	484-05	DT4S5	ST-4-05	RF Bypass Power Supply
41	.01	600	CP6T31	TC-11	684-01	DT6S1	ST-6-01	Filament Bypass
42	68		CM4A18	MS-47	1469-00007	5W5Q7	MOS.5-47	Feedback Network-See Note
43	1000		CC9K50	1FM-21	1467-001	1W5D1	MW.5-21	Audio Coupling-Cer.-Note
44	68		CM4A18	MS-47	1469-00007	5W5Q7	MOS.5-47	Audio Coupling-See Note
45	150		CM5A26	1FM-315	1468-00015	5W5T15	MO.5-315	" " " "
46	47	500		1FM-45	1468-00005	5W5Q5	MO.5-45	Quadrature Network-Note
47	220	500	CM5A30	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
48	220	500	CM5A30	1FM-325	1468-00025	5W5T25	MO.5-325	RF Bypass
49	680	300	CM4A42	1FM-37	1479-0007	1W5T7	MO.3-37	RF Bypass
50	680	300	CM4A42	1FM-37	1479-0007	1W5T7	MO.3-37	De-emphasis
51	4.7		CC0F18	MS-55	1469-000005	5W5V5	MO.5-55	Conv.Plate Bypass -Cer.
52	45	500	CC8A30	1FM-44	1468-00004	5W5Q4	MO.5-44	" " " "
53	680	300	CM4A42	1FM-37	1479-0007	1W5T7	MO.3-37	OSC.Coupling
54	100	500	CM5L22	1FM-31	1468-0001	5W5T1	MO.5-31	OSC.Grid Cap.
55	220	500	CM5A30	1FM-325	1468-00025	5W5T25	MO.5-325	OSC.Feedback
56	470	500	CM8S50					Fixed Trimmer
57	15	500	CM5L03	MS-415				OSC. Feedback
58	220	500	CM5A30	1FM-325	1468-00025	5W5T25	MO.5-325	RF Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BENDIX PART No.	IRC PART No.	IDENTIFICATION CODES
101	150KΩ	¼	RC1H53	BTS-150K	Br.-Grn.-Yl. " " " "
102	6.8 Meg.	¼	RC1H72	BTS-6.8 Meg.	Blue-Gray-Grn. Phono Tone Compensation - See Note
103	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Phono Amp. Grid - See Note
104	6800Ω	¼	RC1H34	BTS-6800	Blue-Gray-Red Phono Amp. Cathode - See Note
105	220KΩ	¼	RC1H54	BTS-220K	Red-Red-Yl. Phono Amp. Plate Load - See Note
106	100KΩ	¼	RC1H51	BTS-100K	Br.-Blk.-Yl. Phono Amp. Plate Decoupling - See Note
107	3.3 Meg.	¼	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. Rectifier Diode Load - See Note
108	3.3 Meg.	¼	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. Reactance Bias Network - See Note
109	47KΩ	¼	RC1H44	BTS-47K	Yl.-Vi.-Or. Reactance Grid - See Note
110	22KΩ	¼	RC1H40	BTS-22K	Red-Red-Or. Reactance Cathode - See Note
111	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Reactance Plate Load - See Note
112	470KΩ	¼	RC1H58	BTS-470K	Yl.-Vi.-Yl. Reactance Screen Dropping - See Note
113	470KΩ	¼	RC1H58	BTS-470K	Yl.-Yl.-Yl. Reactance Cathode Bias - See Note
114	22KΩ	¼	RC1H40	BTS-22K	Red-Red-Or. Bleeder - See Note
115	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Phono Tone Compensation - See Note

Note: Used in Models 1524 & 1525 only.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: BENDIX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
116	117V AC @ .55A	520V CT @ .068A	5.0V AC @ 2.0A	6.3V AC @ 2.1A	TP0J00	P-6011#	T22R02#	P-2951#

Drill new mounting holes and add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: BENDIX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
117	5300Ω	4.0Ω	520Ω	.6Ω	TA0009	A-3877	T22S46	A-2930	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: BENDIX PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
118	PM	4.0Ω	SP1R00	ST-101‡ Mod.P12-T	12A6‡	‡Replace output transformer to match 6-8Ω VC
	CONE DIA.	VC DIA.				
119	11½ in.	7/8 in.				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: BENDIX PART No.	MEISSNER PART No.
120	Loop Ant.		.2Ω		
121	FM Ant.				
122	AM Ant.Coil		1.2Ω	TR8B00	
123	FM Ant.Coil		0Ω	TR8F00	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	BENDIX PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
59	15	500	CC8A24	MS-415				RF Coupling - Cer.
60	45	500	CC8A30	1FM-44	1468-00004	5W5Q4	MO.5-44	RF Coupling - "
61	680	300	CM4A42	1FM-37	1479-0007	1W5T7	MO.3-37	RF Screen Bypass
62	100	500	CM5A22	1FM-31	1468-0001	5W5T1	MO.5-31	Filament Bypass

Note: Used in Models 1524 & 1525 only.
*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	
63A	2 Meg.	½	RV4S10	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 63A per instructions.
C	Switch		Not Req.	41	SW-A	Attach to 63A per instructions.
64A	4 Meg.	½	RV4C00	D11-141	M-68-Z	Tone Control Early Production.
B	Shaft		Not Req.	A	Not Req.	Attach to 64A per instructions.
64A	10 Meg.	½		D11-143	M-99-Z	Tone Control Later Production.
B	Shaft			A	Not Req.	Attach to 64A per instructions.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BENDIX PART No.	IRC PART No.	
65	1 Meg.	¼	RC1H62	BTS- 1 Meg.	Br.-Blk.-Grn. RF Grid
66	68KΩ	½	RC2H46	BTS-68K	Blue-Gray-Or. RF Screen Dropping
67	330Ω	¼	RC1H18	BW-½-330	OR.-Or.-Br. External Loading
68	6800Ω	½	RC2H34	BTS-6800	Blue-Gray-Red Oscillator Plate Load FM
69	22KΩ	¼	RC1H40	BTS-22K	Red-Red-Or.- Oscillator Grid
70	1800Ω	½	RC2G27	BTS-1800	Br.-Gray-Red Converter Cathode
71	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
72	47KΩ	½	RC2H44	BTS-47K	Yl.-Vi.-Or. Converter Plate Load
73	68KΩ	½	RC2H46	BTS-68K	Blue-Gray-Or. Oscillator Plate Load AM
74	100KΩ	¼	RC1H51	BTS-100K	Br.-Blk.-Yl. AVC Network
75	1 Meg.	¼	RC1H62	BTS-1 Meg.	Br.-Blk.-Grn. " "
76	470Ω	¼	RC1H20	BTS-470	Yl.-Vi.-Brn. Decoupling
77	1000Ω	½	RC1H24	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
78	47Ω	½	RC2H08	BW-½-47	Yl.-Vi.-Blk. 1st IF Cathode
79	10Ω	¼	RC2H00	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor
80	220Ω	½	RC2H16	BW-½-220	Red-Red-Br. 2nd IF Cathode
81	1000Ω	½	RC1H24	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
82	2.2 Meg.	¼	RC1H66	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
83	1000Ω	½	RC1H24	BTS-1000	Br.-Blk.-Red Series Test Jack
84	220KΩ	¼	RC1H54	BTS-220K	Red-Red-Yl. Diode Load
85	1000Ω	½	RC1H24	BTS-1000	Br.-Blk.-Red Balancing Resistor
86	33KΩ	¼	RC1H42	BTS-33K	Or.-Or.-Or. Ratio Detector Diode Load
87	22KΩ	¼	RC1H40	BTS-22K	Red-Red-Or. D.A.V.C. Network
88	220KΩ	¼	RC1H54	BTS-220K	Red-Red-Yl. " " "
89	100KΩ	¼	RC1H51	BTS-100K	Br.-Blk.-Yl. De-emphasis
90	100KΩ	¼	RC1H51	BTS-100K	Br.-Blk.-Yl. Tone Compensation
91	10 Meg.	¼	RC1H74	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
92	220KΩ	¼	RC1H54	BTS-220K	Red-Red-Yl. AF Plate Load
93	100KΩ	¼	RC1H51	BTS-100K	Br.-Blk.-Yl. AF Plate Decoupling
94	470KΩ	¼	RC1H58	BTS-470K	Yl.-Vi.-Yl. Output Grid
95	270Ω	1		BW-1-270	Red-Vi.-Br. Output Cathode
96	470KΩ	¼	RC1H58	BTS-470K	Yl.-Vi.-Yl. Phono Shunt
97	10Ω	¼	RC2H00	BW-½-10	Br.-Blk.-Blk. Series Pilot Light
98	220Ω	2		BW-2-220	Red-Red-Br. Filter
99	1500Ω	2	RC4D26	BT-2-1500	Br.-Grn.-Red Filter
100	150KΩ	¼	RC1H53	BTS-150K	Br.-Grn.-Yl. Phono Shunt- See Note

DATE 3/48-#487-3 SET #37-FOLDER #3

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

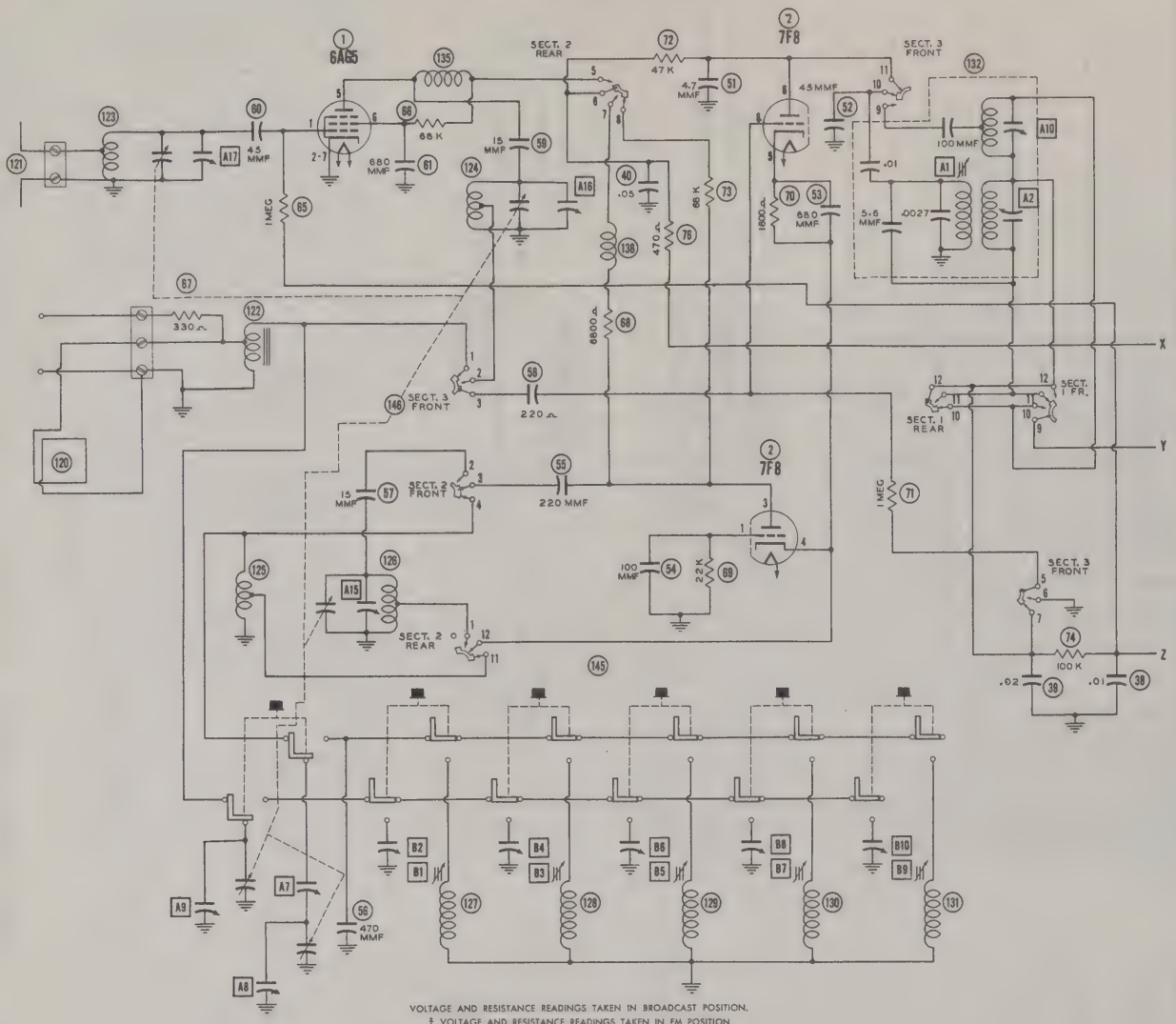
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA BENDIX PART No.	REPLACEMENT DATA MEISSNER PART No.	
124	FM RF Coil		0Ω	TR6P00		
125	AM OSC Coil		5.1Ω	L08B00	14-1040	
126	FM OSC Coil		0Ω	L08F00		
127	PB OSC Coil		.8Ω	LTOA05		
128	PB OSC Coil		.8Ω	LTOA05		
129	PB OSC Coil		2Ω	LTOA04		
130	PB OSC Coil		2Ω	LTOA04		
131	PB OSC Coil		4Ω	LTOA03		
132A	AM Input IF		26Ω	TIOC06		
B	FM Input IF		.1Ω			
133A	AM Inter IF	†9Ω	†9Ω	TIO109		†Includes both primaries and secondaries
B	FM Inter IF					
134A	AM Output IF	§13Ω		TIOD08		§Includes both primaries.
B	FM DIS.Trans		.1Ω			
135	Plate Choke		.1Ω	LFOA01		
136	Plate Choke		.1Ω	LFOA01		
137	Fil.Choke		.1Ω			
138	Fil.Choke		.1Ω			
139	Fil.Choke		.1Ω			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA BENDIX PART No.		INSTALLATION NOTES
140	Bayonet	6-8V	0.15A	Brown	#47		Type 47
141-142	Bayonet	6-8V	0.25A	Blue	#44		Type 44

MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
143	Switch	SR3G00	Phono-Band
144	Switch	SR2A01	Hush-o-matic (Models 1524&1525 only)
145	Push Button Assembly	AB0C02	
146	2 Gang Var.Cap.	CV0D00	(44-547 MMF) Each section
A7	Padder	CT1A11	BC OSC. ADJ.
A8	Trimmer	CT1C01	BC OSC. ADJ.
A9	Trimmer	CT1A10	BC Ant. ADJ.
A15	Trimmer	CT1A09	FM OSC. ADJ.
A16	Trimmer	CT1C00	FM RF ADJ.
A17	Trimmer	CT1C00	FM Ant. ADJ.
	Trimmer	CT1A05	B2
	Trimmer	CT1A04	B4, B6
	Trimmer	CT1A03	B8, B10
	Dial	DS0C05	



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
••TAKEN WITH SWITCH ITEM NO. 144 IN CLOSED POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	-.4VDC	0V.	0V.	6.3VAC	200VDC	102VDC	0V.	-
	2	7F8	-8VDC§	.1VAC	80VDC	0V.	3VDC	127VDC	6.2VAC	-1.4VDC
	3	7AH7	6.3VAC	225VDC	225VDC	0V.	0V.	-.4VDC	.4VDC	0V.
	4	7AG7	6.3VAC	225VDC	225VDC	0V.	0V.	0V.	1.5VDC	0V.
‡	5	6BC8	0V.	0V.	10VDC	17VDC	17VDC	17.5VDC	6.3VAC	18V.
••	6	6AQ6	0V.	2.2VDC	0V.	6.3VAC	0V.	0V.	130VDC	-
••	7	6BA6	0V.	0V.	0V.	6.3VAC	36VDC	11VDC	0V.	-
	8	6BQ7	0V.	-.5VDC	0V.	-.3VDC	.5VDC	105VDC	6.3VAC	0V.
	9	6V6GT	0V.	6.3VAC	250VDC	235VDC	0V.	5VAC	0V.	11VDC
	10	5Y3GT	0V.	280VDC	0V.	280VAC	0V.	280VAC	0V.	280VDC

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	2.6 Meg.	0Ω	0Ω	.1Ω	40KΩ	110KΩ	0Ω	-
	2	7F8	.2MΩ	.1Ω	110KΩ	1Ω	1.8KΩ	90KΩ	.2Ω	2.6 Meg.
	3	7AH7	.1Ω	4MΩ	40KΩ	0Ω	0Ω	1.4 Meg.	50Ω	0Ω
	4	7AG7	1Ω	4MΩ	40KΩ	0Ω	0Ω	9Ω	250Ω	0Ω
‡	5	6BC8	0Ω	0Ω	60KΩ	INF.	INF.	22KΩ	.1Ω	23KΩ
••	6	6AQ6	1 Meg.	6.8KΩ	0Ω	.1Ω	3.5 Meg.	3.5 Meg.	2.2KΩ	-
••	7	6BA6	6.5 Meg.	0Ω	0Ω	.1Ω	1 Meg.	.2KΩ	4Ω	-
	8	6BQ7	0Ω	10 Meg.	0Ω	2 Meg.	280KΩ	360KΩ	.1Ω	0Ω
	9	6V6GT	0Ω	.1Ω	40KΩ	40KΩ	500KΩ	4Ω	0Ω	270Ω
	10	5Y3GT	0Ω	40KΩ	150KΩ	180Ω	INF.	170Ω	.5Ω	40KΩ

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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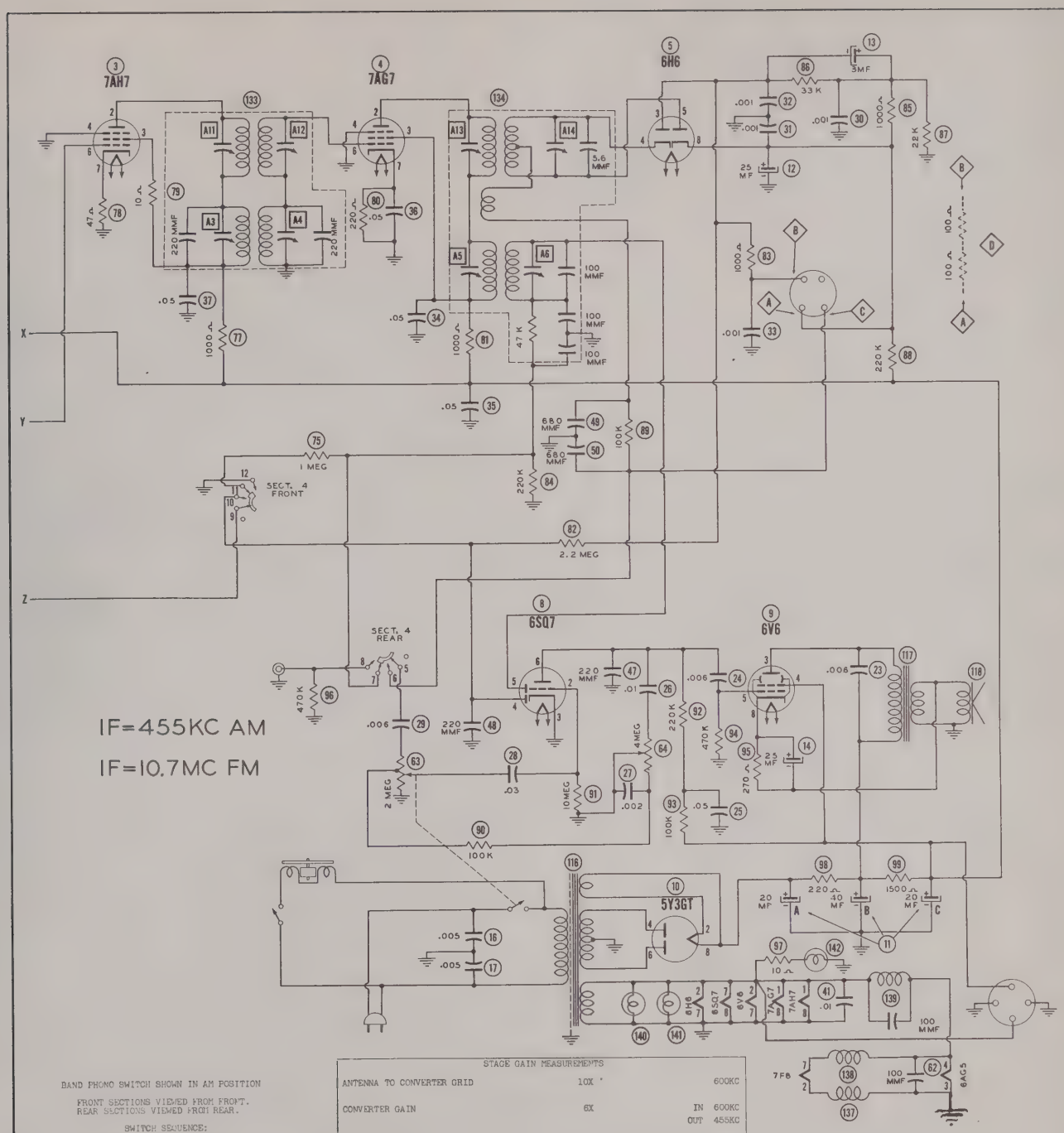
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



BAND PHONO SWITCH SHOWN IN AM POSITION

FRONT SECTIONS VIEWED FROM FRONT.
REAR SECTIONS VIEWED FROM REAR.

SWITCH SEQUENCE:

1 FM
2 AM
3 PHONO

STAGE GAIN MEASUREMENTS

ANTENNA TO CONVERTER GRID	10X	600KC
CONVERTER GAIN	6X	IN 600KC OUT 455KC
1st IF TRANS.	3X	455KC
1st IF TUBE	100X	455KC
2nd IF TRANS.	.15X	455KC
2nd IF TUBE	1...X	455KC
OUTPUT IF TRANS.	.7...X	455KC
AUDIO	95X	400~
OUTPUT	15X	400~
HUSHOMATIC AUDIO	35X	400~

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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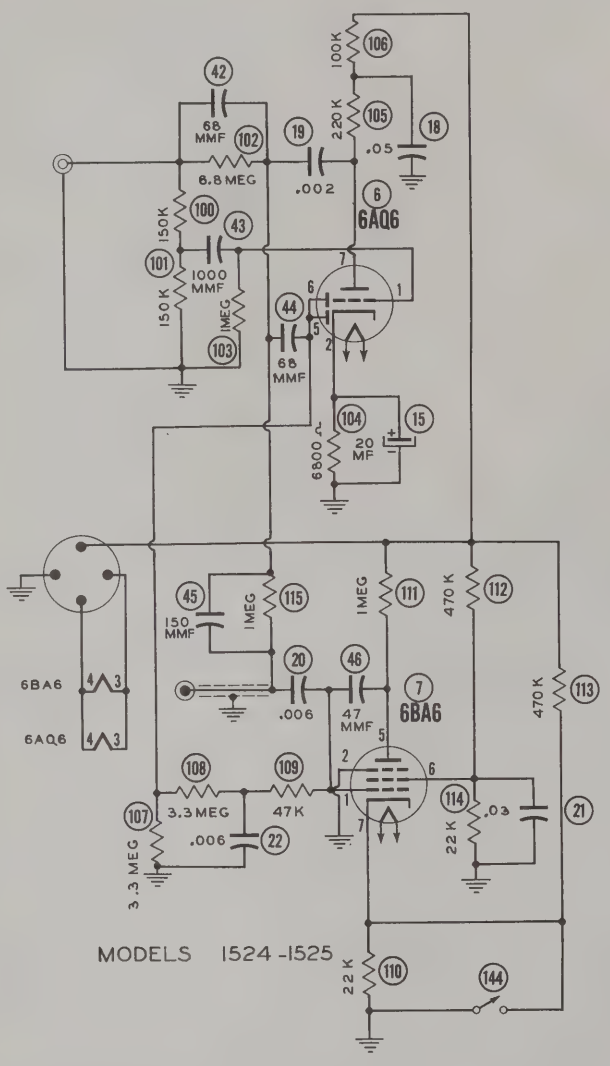
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



MODELS 1524-1525

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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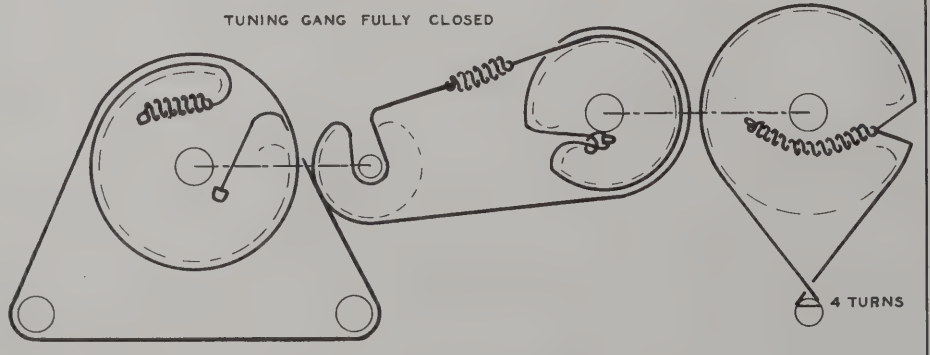
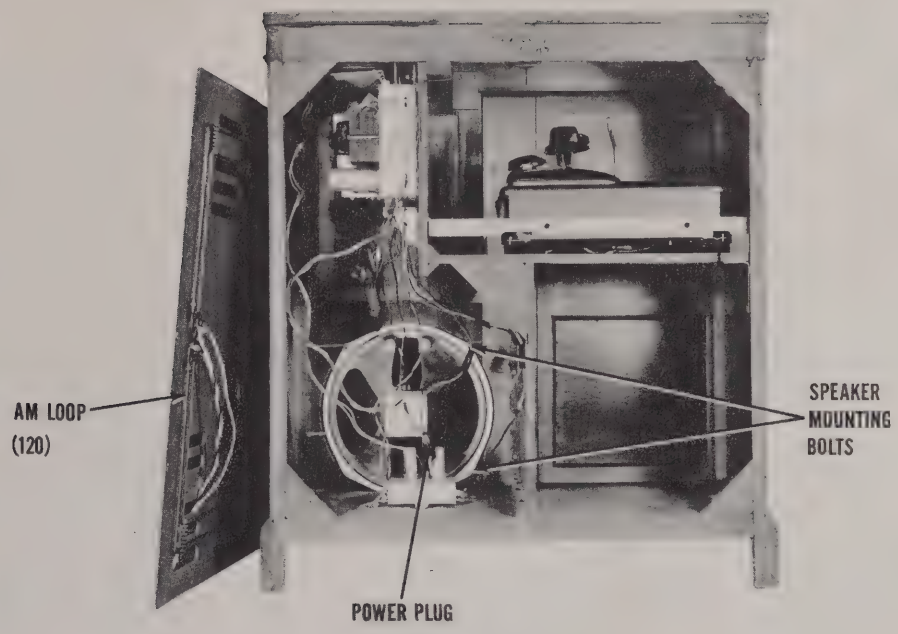
487-3



DIAL CORD DRIVE



DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs.
2. Remove eighteen screws holding loop antenna to back of cabinet. Remove loop antenna plug from chassis. Remove FM antenna leads from terminal strip on loop antenna mounting board. Remove loop from cabinet.
3. Remove speaker plug from chassis.
4. Disconnect phono-motor plug.
5. Disconnect phono pre-amp. power supply plug.
6. Remove phono-pickup power plug from pre-amp. chassis.
7. Remove phono-pickup plug from tuning chassis.
8. Remove two screws holding hush-o-matic switch in cabinet.
9. Remove three wood screws holding phono-pre-amp. chassis in cabinet. Remove chassis from cabinet.
10. Remove four screws holding tuning chassis in cabinet. Remove chassis from cabinet.
11. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

PUSHBUTTON ADJUSTMENTS

Range of pushbuttons ranging from right to left is: 1st button right is manual tuning button, 900-1550KC, 900-1550KC, 650-1250KC, 650-1250KC, 540-925KC.

1. Make a list of stations desired to be set up ranging from high to low frequency making certain that each station falls within the range of the button to be used.
2. Turn receiver on and allow it to warm up for about 15 minutes.
3. Turn band switch to AM position (center position) and remove buttons by pulling out.
4. Push in the first button shaft from the right and manually tune in first station on your list.
5. Push in 2nd button shaft and adjust B1 to tune in station. Check to ascertain whether you have the correct station by alternately pushing in the manual button shaft and then the button shaft which you are setting up.
6. Adjust B2 for maximum volume.
7. To set up the remaining buttons follow the same procedure outlined above adjusting B3, B5, B7 & B9 to tune in stations and B4, B6, B8 & B10 for maximum volume.
8. Replace buttons.

DATE 3/48-#487-3 SET #37-FOLDER #3

FM ALIGNMENT

In Steps 11 and 12 if calibration is off, use following procedure for checking and adjusting inductance of coils. Tune to calibration mark, connect VTVM to Point Ⓐ and Ⓑ. Insert iron core end of tuning wand into oscillator coil. If deflection increases compress coil slightly. If deflection decreases insert brass end of tuning wand in oscillator coil. If deflection increases spread turns slightly. Coil is adjusted correctly when upon insertion of either end of tuning wand there is a decrease in deflection of meter. Adjust RF and Ant. Coils in same manner. After coils have been adjusted repeat alignment of RF trimmers (Steps 9, 10).

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation 450KC sweep.

FM dummy antenna consists of 300Ω carbon resistor in series with 30Ω carbon resistor with a .01 MFD capacitor connected to junction of two resistors. The 300Ω resistor is connected to ungrounded FM ant. terminal. The 30Ω resistor is connected to grounded terminal. The 30Ω resistor may be varied to match output impedance of signal generator.

The scope horizontal synchronizing voltage may be taken from power line if synchronizing voltage is not available from signal generator. There may be some phase shift encountered between signal generator and horizontal sweep resulting in double trace pattern per Fig. 2. If provision is made for this in the scope rotate phase control until the two curves coincide as in Fig. 1. If no provision is made for this the same thing may be accomplished by inserting a capacitor of suitable value (.01 to .1 MFD.) in series with horizontal sweep input.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	.05 MFD.	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (unmodulated)	FM (fully counter-clockwise)	Tuning cap. fully open.	DC probe of VTVM connected to Point Ⓐ. Common to Point Ⓑ.	A10, A11, A12, A13	Connect a short from front FM stator of tuning cap. to chassis. Adjust for maximum deflection.
						CONNECT SCOPE		
8	.05 MFD.	"	Approx. 10.7MC (Freq. mod.). Adjust signal gen. until curve of Fig. 1 is centered on horizontal scope sweep line.	"	"	High side of oscilloscope vertical input to Point Ⓒ. Low side to chassis	A14	Adjust for maximum symmetry, per curve of Fig. 1. It may be necessary to adjust alternately A13 and A14 to obtain best possible curve.
9	FM dummy ant. (See prealignment notes)	High side to .01 MFD cap. of dummy. Low side to chassis.	106MC (freq. mod.)	"	106MC reference mark.	"	A15	Remove short from FM stator from Step 7 and adjust until "S" curve is centered on horizontal scope sweep line. Check for image by tuning sig. gen. to 84.6MC. If signal is not heard then A15 is adjusted correctly. If signal is heard retune signal gen. to 106MC and loosen trimmer until next peak is obtained. Then adjust until "S" curve is centered on horizontal scope sweep line and recheck for image.
10	"	"	"	"	"	"	A16, A17	Rock tuning cap. to keep "S" curve centered on horizontal scope sweep line while adjusting A16 and A17 for maximum height of curve.
11	"	"	97MC	"	Tune until "S" curve is centered on scope.	"		Check calibration.
12	"	"	90MC	"	"	"	FM Osc (95) RF (93) & Ant. (92) coils.	Check calibration. If calibration is not within reasonable tolerance at 90 and 97MC adjust coils per prealignment notes. If coils must be adjusted then Steps 9 & 10 must be repeated.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

VTVM must not be AC-DC or with ground connected to AC line or through a resistor.

In Step 14 connect 2 100KΩ resistors in series from Point Ⓐ to Point Ⓑ. The junction of these two resistors is Point Ⓓ. These resistors must be within 1% of each other.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7	.01 MFD	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (unmodulated)	FM	Tuning cap. fully open.	DC probe of VTVM connected to Point Ⓐ. Common to Point Ⓑ.	A10, A11, A12, A13	Short from FM stator of tuning cap. to ground. Adjust for maximum deflection in order given and repeat.
8	.01 MFD	"	"	"	"	DC probe to Point Ⓒ. Common to Point Ⓓ.	A14	If available use zero center scale VTVM. Adjust for zero deflection. Repeat Step 7 adjusting A13 for maximum only and Step 8 adjusting A14 for zero deflection only several times to assure correct alignment.
9	See prealignment notes.	High side to .01 MFD. cap. of dummy. Low side to chassis.	106MC (amplitude modulation)	"	106MC reference mark at high freq. end of dial.	DC probe of VTVM connected to Point Ⓐ. Common to Point Ⓑ.	A15	Remove short from FM stator of Step 13. Adjust for maximum deflection. Check for image as outlined in Step 9 under scope alignment.
10	"	"	"	"	Tune for maximum deflection.	"	A16, A17	Rock tuning cap and adjust for maximum deflection.
11	"	"	97MC	"	"	"		Check calibration.
12	"	"	90MC	"	"	"	FM Osc (95) RF (93) & ant. (92) coils.	Check calibration at 90 and 97MC. If calibration is not within reasonable tolerance adjust FM coils per prealignment instructions. If coils must be adjusted, then repeat Steps 9 & 10.

Fig. 1

Fig. 2

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

CISCO MODEL 1A5

TRADE NAME	Cisco, Model 1A5
SUPPLIER	Cities Service Oil Co., New York, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	117 Volts AC-DC
TUNING RANGE—BROADCAST	540-1700KC RATING .245 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to stator of ant. section of gang. Low side to chassis.	456KC	Quiet point at high end of band.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune in 1400 KC signal.	"	A6	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CISCO MODEL 1A5

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CISCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CISCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	3-3	TA-240	PRS150-40-40	BRD4215	DSB-2x40-150	Filter
B	20	150	(10B143)					
7	.1	400		TC-1	484-.1	DT4P1	ST-4-1	Line Bypass
8	.1	400		TC-1	484-.1	DT4P1	ST-4-1	Line Isolating*
9	.02	400		TC-12	484-.02	DT4S2	ST-4-02	50L6 Plate Bypass
10	.01	400		TC-11	484-.01	DT4S1	ST-4-01	Audio Coupling
11	.01	400		TC-11	484-.01	DT4S1	ST-4-01	" "
12	.05	200		TC-15	484-.02	DT4S5	ST-4-05	AVC Filter
13	250	500		1FM-325	1468-.00025	5W5T25	MO.5-325	Audio Plate Bypass
14	100	500		1FM-31	1468-.0001	5W5T1	MO.5-31	RF Bypass Vol. Cont.
15	100	500		1FM-31	1468-.0001	5W5T1	MO.5-31	Osc. Grid Cond.

*Used in Underwriters approved models only.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CISCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	1	20-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

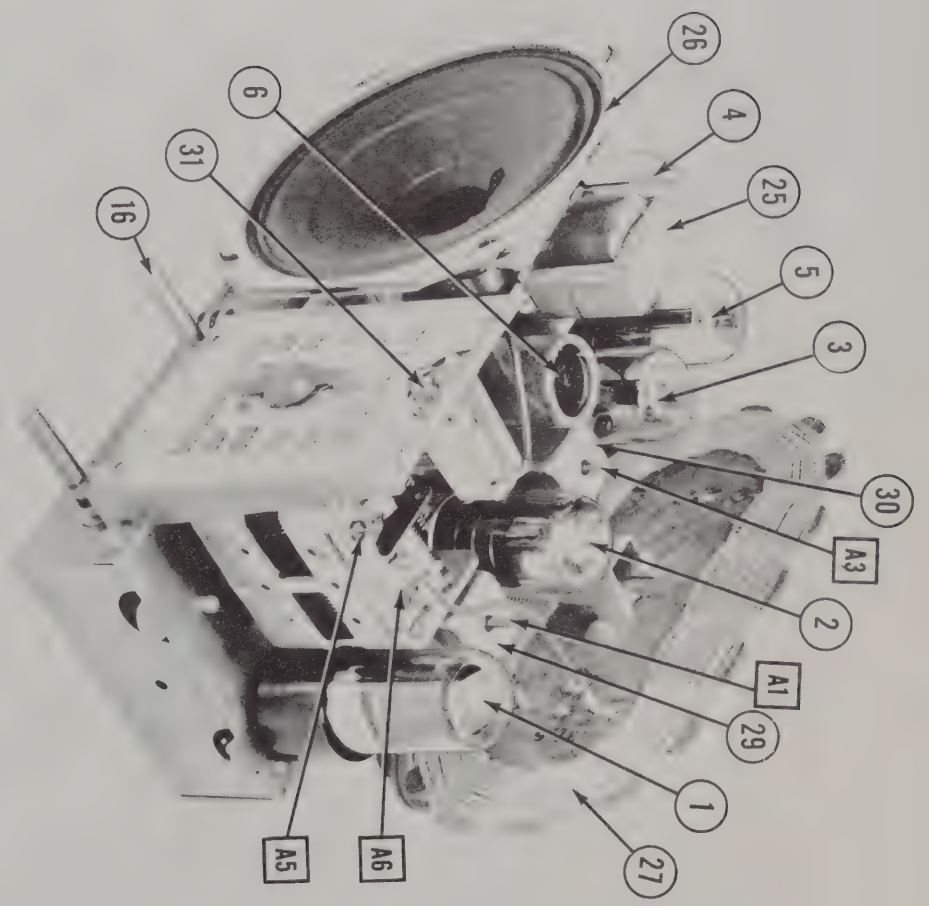
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CISCO PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
18	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Diode Load
19	6 Meg.	½		BTS-5.6 Meg.	Blue-Blk.-Grn. 1st AF Grid
20	560KΩ	½		BTS-560K	Grn.-Blue-Yl. 1st AF Plate Load
21	560KΩ	½		BTS-560K	Grn.-Blue-Yl. Output Grid
22	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
23	2000Ω	1		BW-1-2200	Red-Blk.-Red Filter
24	10Ω	½		BW-½-10	Br.-Blk.-Blk. Pilot Light Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CISCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25	2500Ω	3.16Ω	192Ω	.58Ω		A-3876#	T22S45#	A-2928#	#Bend mounting tabs down and mount by original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CISCO PART No.	JENSEN PART No.	QUAM PART No.	
26	FIELD / PM	VC IMP. / 3.16Ω	8-1	ST-105* Mod. P5-X	5A1*	*Fabricate new mounting bracket.
27	CONE DIA. / 4½"	VC DIA. / ½"				

R F COILS

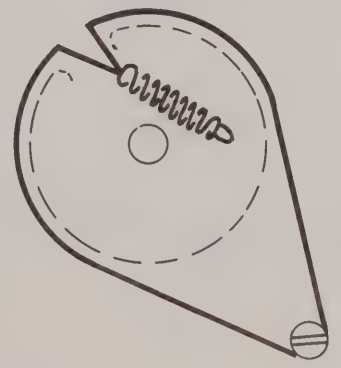
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CISCO PART No.	MEISSNER PART No.	
28	Loop Ant.	1Ω		32-5		
29	Osc. Coil	1Ω	5.2Ω	14-1		
30	Input IF	10Ω	10Ω	15-3		
31	Output IF	10Ω	10Ω	15-3		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					CISCO PART No.		
32	Bayonet	6-8	15	Brown			Type 47

MISCELLANEOUS

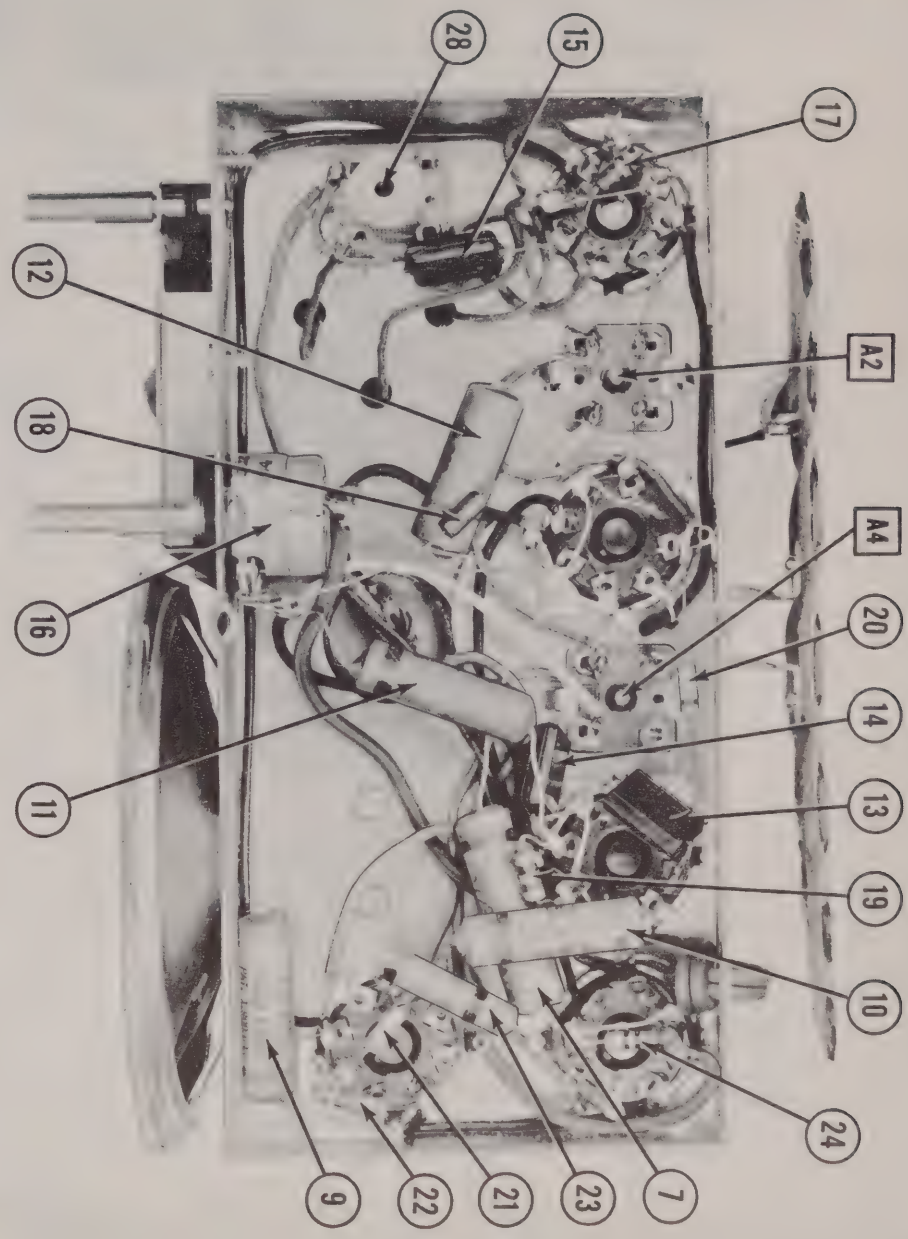
ITEM No.	PART NAME	CISCO PART No.	NOTES
33	2 Gang Var. Cap. Dial Pointer Dial Plate	6-1 720-3D 1-2	



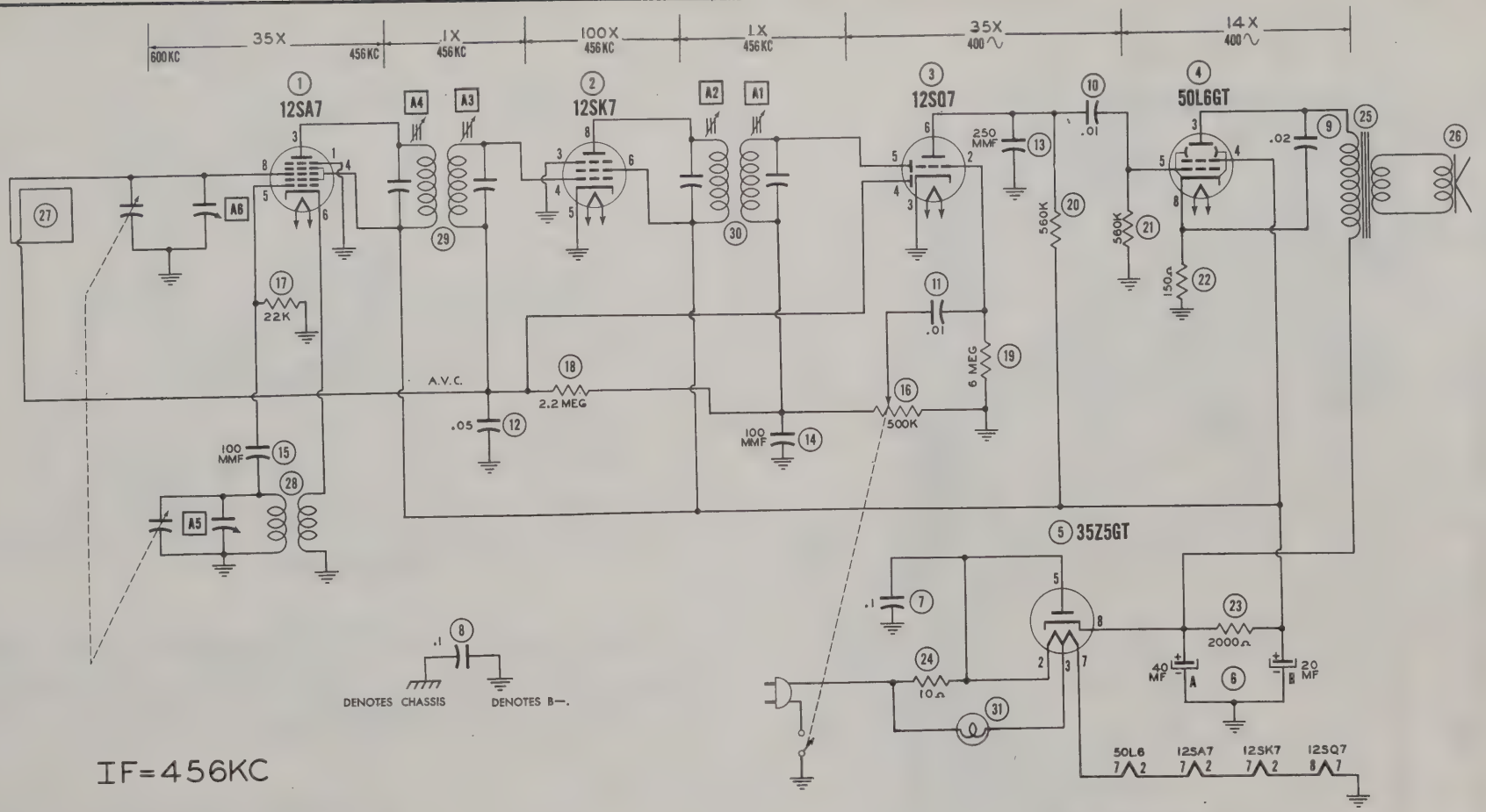
2 1/2 TURNS

DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



CISCO MODEL 1A5



IF=456KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	27VAC	80VDC	80VDC	-9VDC§	0V.	40VAC	-.67VDC
2	12SK7GT	0V.	13.5VAC	0V.	-.67VDC	0V.	80VDC	27VAC	80VDC
3	12SQ7GT	0V.	-.6VDC	0V.	-.67VDC	-.42VDC	45VDC	13.5VAC	0V.
4	50L6GT	0V.	40VAC	125VDC	80VDC	0V.	0V.	82VAC	4.4VDC
5	35Z5GT	0V.	116VAC	113VAC	0V.	116VAC	117VAC	88VAC	130VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	27Ω	3 Meg.	3 Meg.	22KΩ	0Ω	40Ω	3 Meg.
2	12SK7GT	0Ω	14Ω	0Ω	3 Meg.	0Ω	3 Meg.	27Ω	3 Meg.
3	12SQ7GT	0Ω	6 Meg.	0Ω	3 Meg.	470KΩ	3 Meg.	14Ω	0Ω
4	50L6GT	INF.	40Ω	3 Meg.	3 Meg.	560KΩ	INF.	100Ω	140Ω
5	35Z5GT	0Ω	135Ω	130Ω	INF.	135Ω	135Ω	100Ω	3 Meg.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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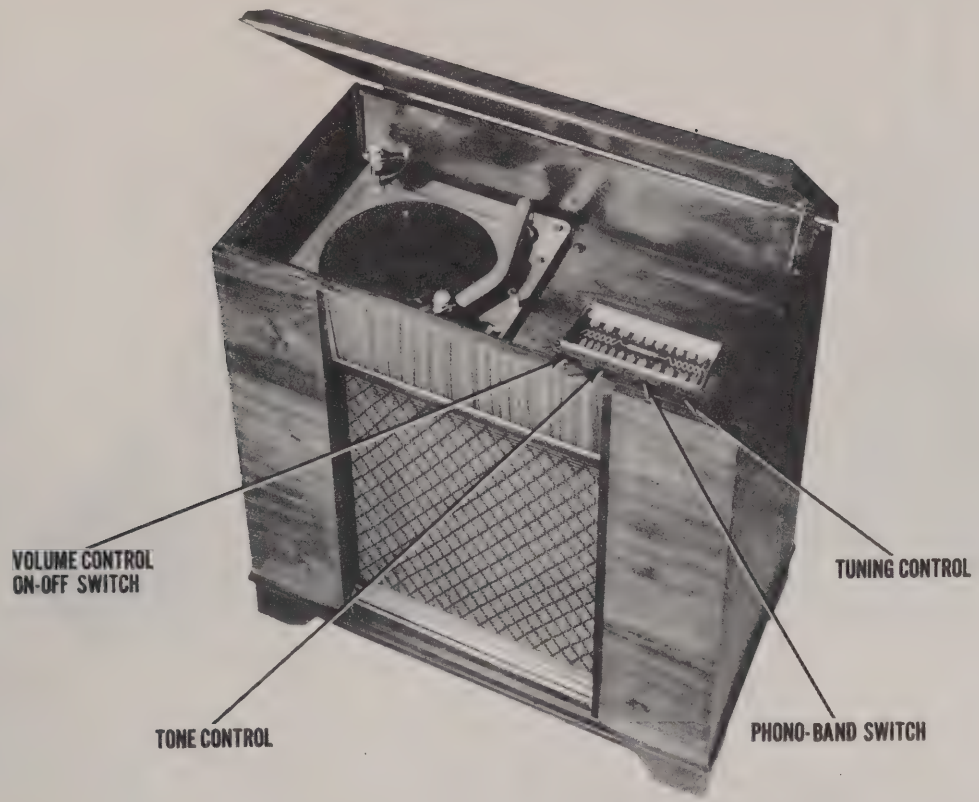
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

CROSLEY MODELS
68CP, 68CR



CROSLEY MODELS
68CP, 68CR

CROSLEY MODEL 68CP

TRADE NAME	Crosley, Models 68CP, 68CR
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC Operated Combination Phono-Radio 2 Band Superheterodyne Receiver with Loop Ant.
TUBES (SIX)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .57 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — SHORT WAVE 5.8-15MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed & set pointer to notch at lower right hand corner of dial backplate.

During alignment loop must be connected or a dummy ant. coil of 4 microhenries substituted for the loop.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to ext ant. post. Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	"	"	"	"	"	A5	Adjust for minimum output.
3	400Ω carbon res.	"	15.3MC	SW (fully clock-wise)	"	"	A6	Adjust for maximum output. Tune sig. gen. to 16.2MC. If sig. gen. is not heard retune sig. gen. to 15.3 and open A6 to next peak. Adjust for maximum output & recheck for image.
4	"	"	15MC	"	Tune for max-imum output.	"	A7	Rock tuning cap. and ad-just for maximum output.
5	200MMFD	"	1620KC	BC	Tuning cap. fully open.	"	A8	Adjust for maximum output.
6	200MMFD	"	1400KC	"	Tune for max-imum output.	"	A9	" " " "
7	200MMFD	"	600KC	"	Tune for max-imum output.	"	A10	Adjust for maximum output. Repeat Step 6.

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PARTS LIST AND DESCRIPTIONS

CROSLEY
MODELS 68CF, 68CR

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
1	RF Amp.		6SK7	8N	
2	Converter		6SA7	8R	
3	IF Amp.		6SK7	8N	
4	Det.-AVC-AF		6SQ7	6Q	
5	Power Output		6V6GT	7AC	
6	Rectifier		5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
7A	20	360		EL-442	AF444J4A	UP22245C	DY-405	Filter - Red
B	20	275						" - Blue
C	20	245						" - Grn.
D	20	25						Cathode Bypass-Yl.
7A	40	450	B-137076	EL-424	AF862J4A	UP43145C	DY-406	Alternate Filter
B	20	450						" "
C	20	450						" "
D	20	25						" "
8	30	450		UT-30	PRS450-30	BR3045	M-30-450	Filter
9	.01	400	W-30805	TC-11	484-01	DT4S1	ST-4-01	Line Filter
10	.005	600	39001-11	TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
11	.00025	600	39001-73	TC-325	1468-00025	DT6T25	ST-6-00025	Output Grid Bypass
12	.01	400	39001-13	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
13	.005	600	39001-11	TC-25	684-005	DT6D5	ST-6-005	Tone Compensation
14	.005	600	39001-11	TC-25	684-005	DT6D5	ST-6-005	Audio Coupling
15	.01	200	39001-13	TC-11	484-01	DT2S1	ST-4-01	Tone Compensation
16	.05	200		TC-15	484-05	DT2S5	ST-4-05	AVC Filter
17	.00025	600	39001-73	TC-325	1468-00025	DT6T25	ST-6-00025	RF Coupling
18	.05	400	39001-17	TC-15	484-05	DT4S5	ST-4-05	Screen Bypass
19	.00025	600	39001-73	TC-325	1468-00025	DT6T25	ST-6-00025	Osc. Grid Cap.
20	.00025	600	39001-73	TC-325	1468-00025	DT6T25	ST-6-00025	RF Coupling
21	47	500	39001-17	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Filter
22	50	500	B-137727-21	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling-Cer.
23	580	500	B-137498-14	1FM-36	1468-0005	1W5T6	MO.5-36	Fixed Padder

CONTROLS

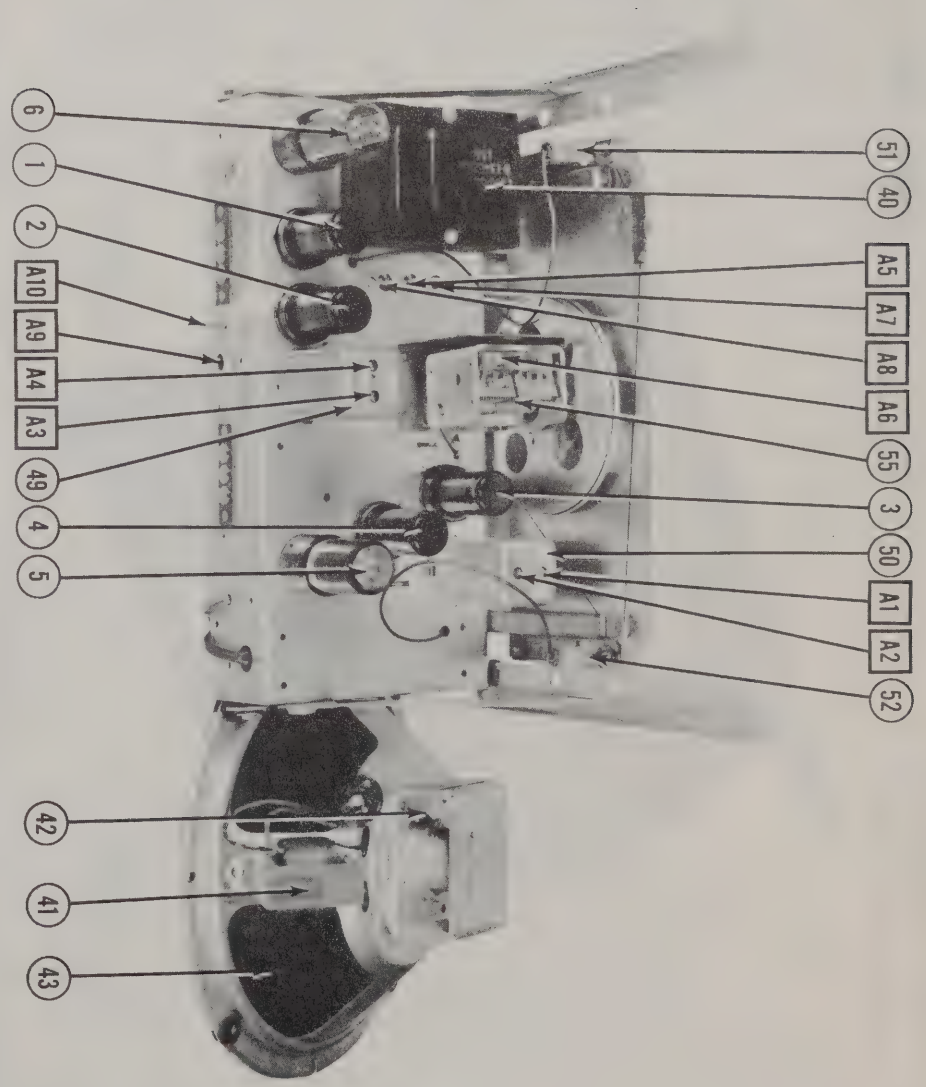
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	
24A	1 Meg.	½	B-135313	D13-137X	AT-109	Volume Control tapped @ 200KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 24A per instructions
C	Switch		" "	41	SW-A	" " " "
25A	3 Meg.	½	B-135314	D13-140*	AM-67-Z*	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 25A per instructions

*Use ground lug on center terminal.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
26	3300Ω	½	39373-44	BTS-3300	Or.-Or.-Red RF Plate Load
27	22KΩ	½	39373-60	BTS-22K	Red-Red-Or. Oscillator Grid
28	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
29	12KΩ	2	39373-275	BT-2-12K	Br.-Red-Or. Converter Screen Dropping
30	1000Ω	1	39373-143	BTA-1000	Br.-Blk.-Red Decoupling
31	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. Diode Filter
32	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
33	33KΩ	½	39373-64	BTS-33K	Or.-Or.-Or. Tone Compensation
34	5 Meg.	½		BTS-4.7 Meg.	Grn.-Blk.-Grn. AF Grid
35	330KΩ	½	39373-84	BTS-330K	Or.-Or.-Yl. AF Plate Load
36	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
37	330Ω	1	39373-133	BW-1-330	Or.-Or.-Br. Output Cathode
38	1000Ω	5	39371-5	AB-1000	Filter
39	22KΩ	½	39373-60		Converter Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	CROSLEY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
40	117V AC @ .57A	620V CT @ .06A	5.0VAC @ 2.0A	6.3V AC @ 2.0A	B-134625	P-6120†	T22R02§	P-2951§

†Mount vertically with universal mounting brackets.
§Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
41	3900Ω	3.9Ω	260Ω	.3Ω	Part of C-138777	A-3823	T22S87	A-2902	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-119#		#Replace output transformer to match 6-8Ω voice coil.
42	PM	3.9Ω	C-138777	Mod. P10-T	10A31	
	CONE DIA.	VC DIA.				
43	4½"	3/4"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.
44	Loop Ant.		.1Ω	W-139692	
45	BC Ant.Coil	73Ω	2.5Ω	AW-13908-1	14-1064
46	SW " "	.3Ω	.1Ω	AW-139081	14-1044
47	RF Coil		32Ω	AW-139073	
48A	BC Osc.Coil		4.5Ω	AW-139079	
B	SW " "		.6Ω		
49	Input IF	24Ω	24Ω	AW-137495	16-6658
50	Output IF	23Ω		AW-139080	16-6670

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					CROSLEY PART No.		
51	Bayonet	6-8	0.15	Brown	W-48858		Type 47
52	"	6-8	0.15	"	W-48858		" "

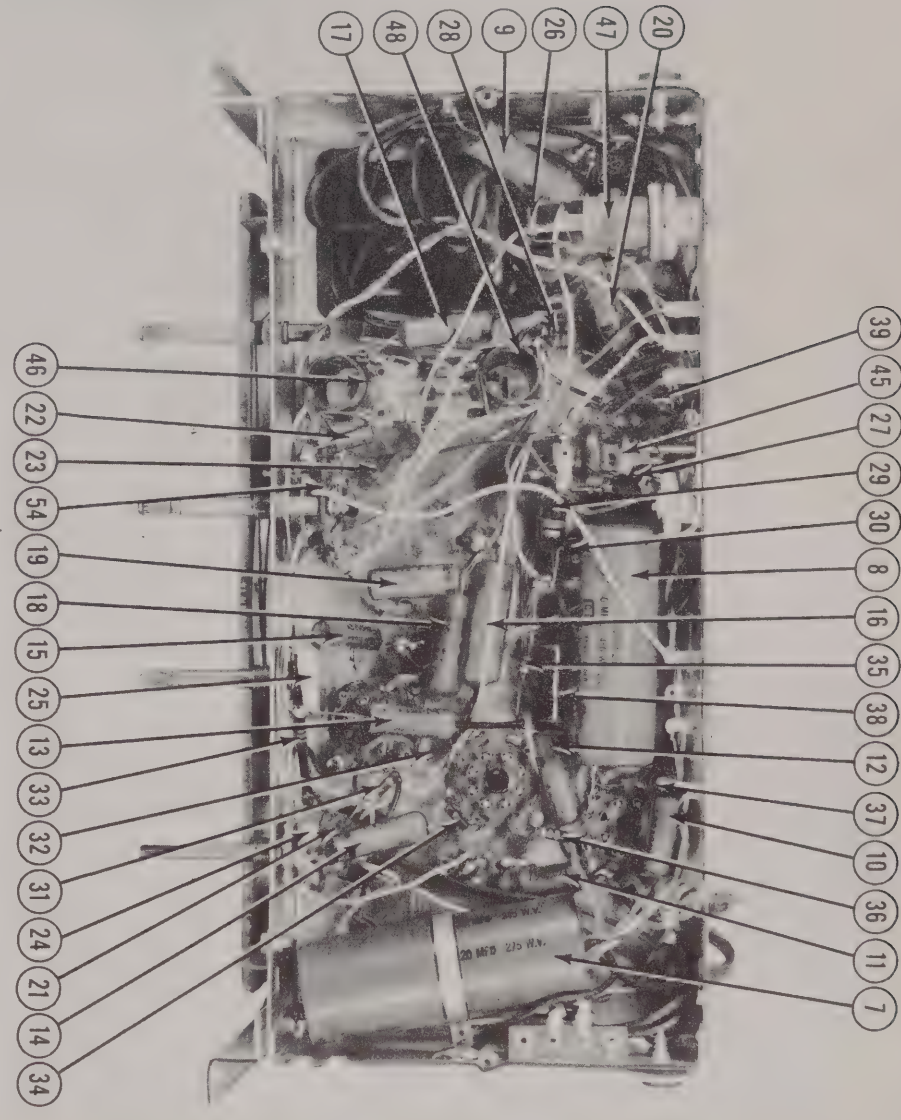
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	CROSLEY PART No.	ASTATIC PART No.	
53		L-72-A	L-72 Original Part

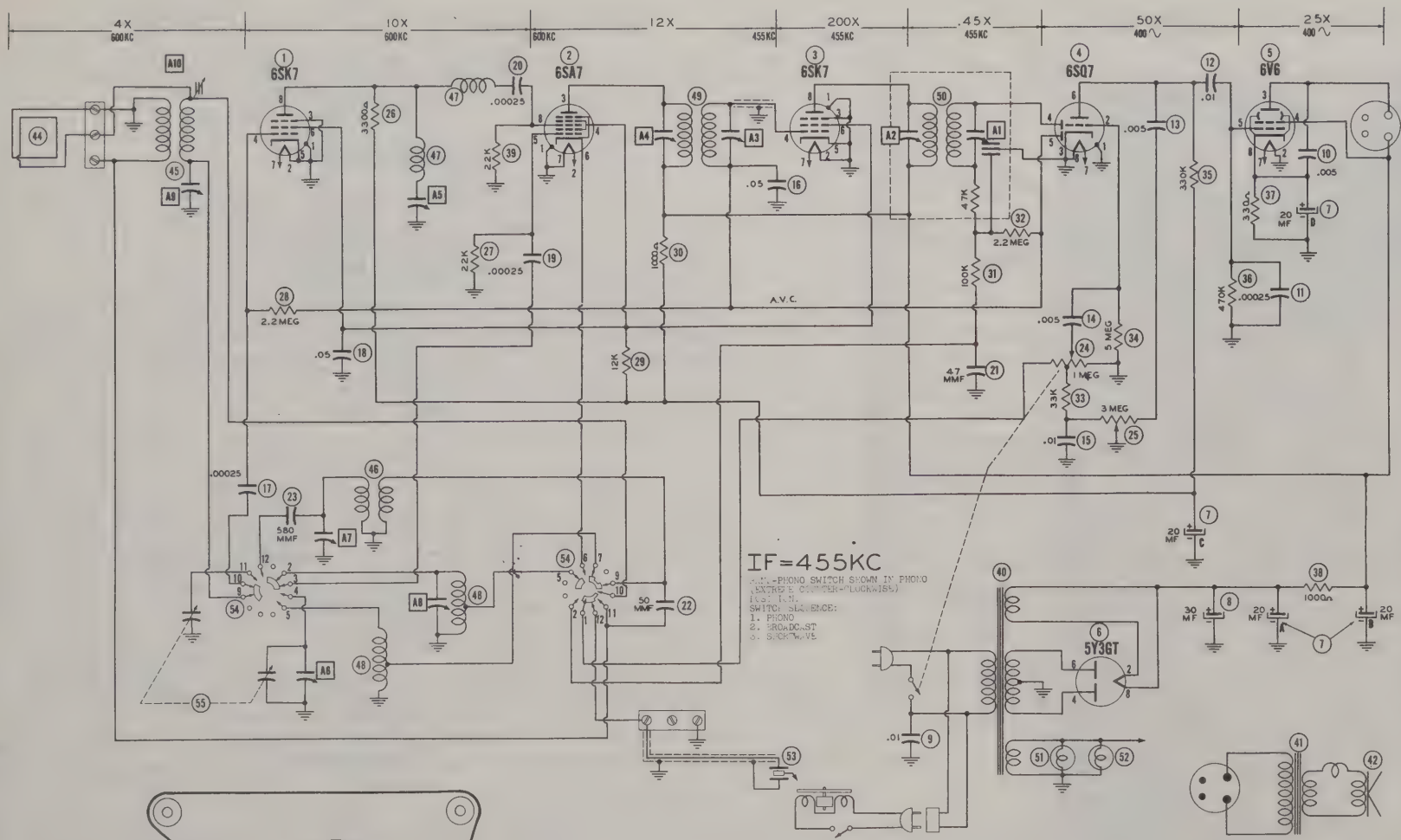
MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
54	Switch	B-135312	Phono-Band
55	2 Gang Var. Cap.	B-137073-3	(16-463MMF, 22-158MMF)
A5	Trimmer Strip	B-132386-7	IF Trap Adj.
A7			SW Osc. Adj.
A8			BC Osc. Adj.
A9	Trimmer	W-132267-1	BC Ant. Adj.
	Dial Glass	D-139376	
	Dial Pointer	W-135274	
	Knob	W-135309	

CHASSIS—BOTTOM VIEW



CROSLEY MODELS 68CP, 68CR



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

Pin No.	6SK7 Volt.	6SK7 Res.	6SA7 Volt.	6SA7 Res.
1	0V	0Ω	0V	0Ω
2	0V	0Ω	0V	0Ω
3	0V	0Ω	250VDC	100KΩ
4	-.8VDC	3.4MEG.	80VDC	115KΩ
5	0V	0Ω	-12VDC§	22KΩ
6	80VDC	115KΩ	0V	1Ω
7	6.3VAC	.1Ω	6.3VAC	.1Ω
8	200VDC	105KΩ	0V	22KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

Pin No.	6SK7 Volt.	6SK7 Res.	6SQ7 Volt.	6SQ7 Res.
1	0V	0Ω	0V	0Ω
2	0V	0Ω	-.4VDC	5MEG
3	0V	0Ω	0V	0Ω
4	-.8VDC	3.3MEG	-.5VDC	1.15MEG
5	0V	0Ω	-.8VDC	3.3MEG
6	80VDC	115KΩ	37VDC	430KΩ
7	6.3VAC	.1Ω	6.3VAC	.1Ω
8	250VDC	100KΩ	0V	0Ω

Pin No.	6V6GT Volt.	6V6GT Res.	5Y3GT Volt.	5Y3GT Res.
1	0V	0Ω	0V	0Ω
2	0V	0Ω	325VDC	100KΩ
3	245VDC	100KΩ	0V	INF.
4	250VDC	100KΩ	310VAC	200Ω
5	0V	470KΩ	85VAC	INF.
6	325VDC	100KΩ	310VAC	185Ω
7	6.3VAC	.1Ω	0V	INF.
8	12.5VDC	340Ω	325VDC	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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487-5

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GENERAL ELECTRIC
MODEL 356, 357, 358

GENERAL ELECTRIC
MODEL 356, 357, 358

GENERAL ELECTRIC MODEL 356

TRADE NAME	General Electric, Models 356, 357, 358
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6AG5 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp., 6AU6 2nd IF Amp., 6AU6 FM Limiter, 6S8GT AM Det.-FM Disc.-AF, 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
RATING	.41 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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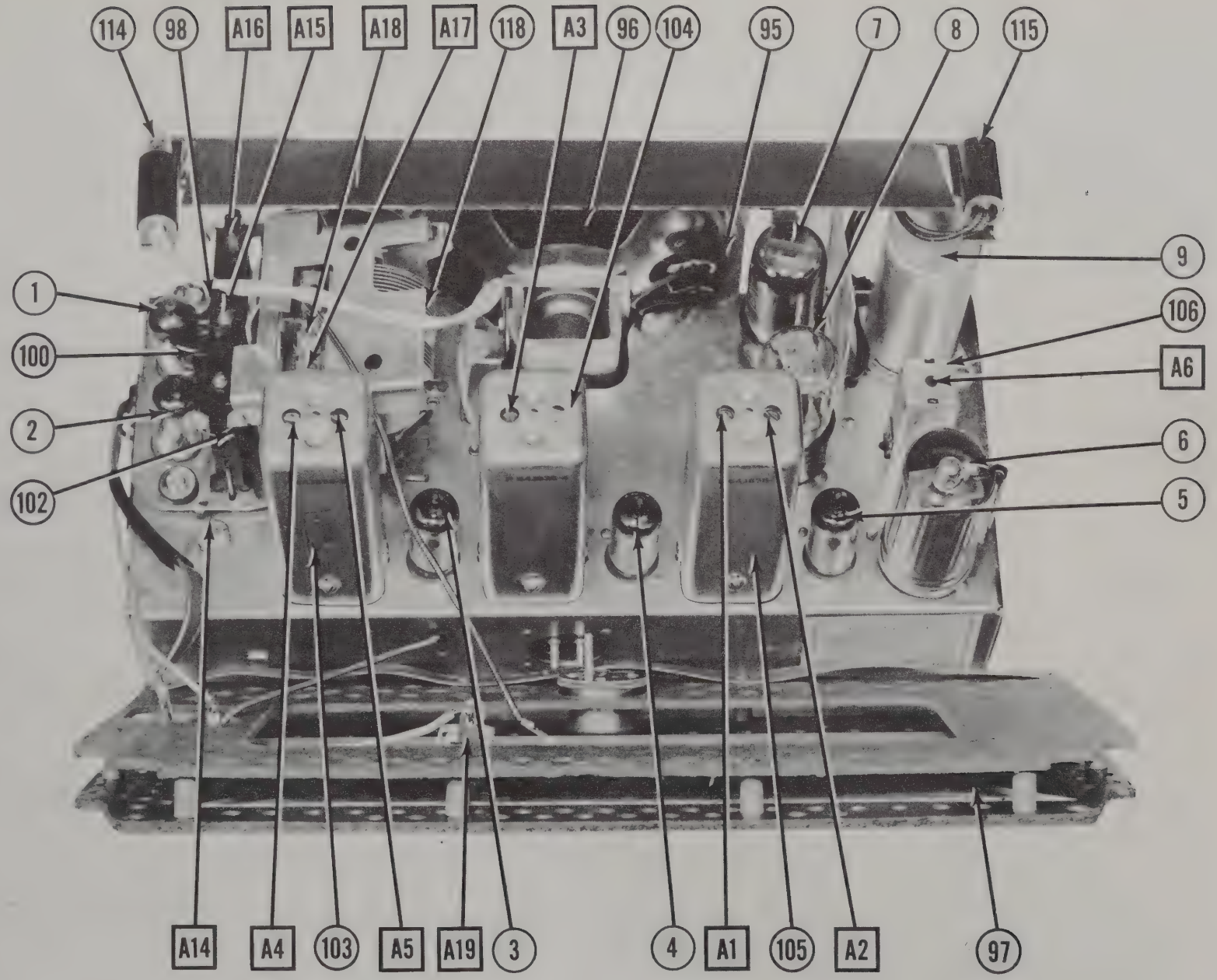

114
98
A16
A15
A18
A17
118
A3
96
104
95
7
8
115
1
100
2
102
9
106
A6
6
5
A14
A4
103
A5
A19
3
4
A1
105
A2
97

A
A7
A8
A9
A10
A11
A12
A13
B
C

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6AG5	6AG5	7BD	
2	Converter	6BE6	6BE6	7CH	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6AU6	6AU6	7BK	
5	FM Limiter	6AU6	6AU6	7BK	
6	AM Det.-FM Disc.-AF	6S8GT	6S8GT	8CB	
7	Power Output	25L6GT	25L6GT	7AC	
8	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	50	150	RCE-065	EL-452	AF101010D4A	UP55515C	DY-419	■ Filter
B	50	150						◓ "
C	50	150						▲ "
D	30	25						Cathode Bypass
10	.05	400	UCC-028	TC-15	484-05	DT4S5	MPH-4-05	Line Filter
11	.005	600	UCC-039	TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
12	.02	400	UCC-026	TC-12	484-02	DT4S2	ST-4-02	Audio Coupling
13	.003	600	UCC-003	TC-23	684-003	DT6D3	ST-6-003	" "
14	.01	200	UCC-008	TC-11	484-01	DT2S1	ST-4-01	" "
15	.01	200	UCC-008	TC-11	484-01	DT2S1	ST-4-01	Tone Compensation
16	.002	600	UCC-621	TC-22	684-002	DT6D2	ST-6-002	" "
17	.05	400	UCC-028	TC-15	484-05	DT4S5	ST-4-05	Vol. Cont. Isolation
18	.02	400	UCC-026	TC-12	484-02	DT4S2	ST-4-02	Limiter Decoupling
19	.02	400	UCC-026	TC-12	484-02	DT4S2	ST-4-02	2nd IF Decoupling
20	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	2nd IF Cathode Bypass
21	.05	400	UCC-028	TC-15	484-05	DT4S5	ST-4-05	1st IF Decoupling
22	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
23	.02	600	UCC-026	TC-12	684-02	DT6S2	ST-6-02	Conv. Decoupling
24	.05	400	UCC-028	TC-15	484-05	DT4S5	ST-4-05	RF Decoupling
25	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
26	.01	600	UCC-025	TC-11	684-01	DT6S1	ST-6-01	Ext. Ant. Isolation
27	.02	600	UCC-026	TC-12	684-02	DT6S2	ST-6-02	Switch Isolation
28	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	Filament Bypass
29	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	" "
30	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	" "
31	.05	200	UCC-011	TC-15	484-05	DT2S5	ST-4-05	" "
32	47	500	UCU-020	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Bypass
33	47	500	UCU-020	1FM-45	1468-00005	5W5Q5	MO.5-45	AF Plate Bypass
34	470	500	UCU-544	1FM-35	1468-0005	5W5T5	MO.5-35	RF Bypass
35	470	500	UCU-044	1FM-35	1468-0005	5W5T5	MO.5-35	De-emphasis
36	47	500	UCU-020	1FM-45	1468-00005	5W5Q5	MO.5-45	Diode RF Filter
37	47	500	UCU-020	1FM-45	1468-00005	5W5Q5	MO.5-45	" " "
38	47	500	RCW-1052	1FM-45	1468-00005	5W5Q5	MO.5-45	IF Coupling - Cer.
39	10	500	RCW-020	MS-41	1468-00001	5W5Q1	MO.5-41	Fixed Trimmer - Cer.
40	470	500	UCW-044	1FM-35	1468-0005	5W5T1	MO.5-35	Conv.Decoupling - Cer.
41	12	500	RCW-1055	MS-41	1468-00001	5W5Q1	MO.5-41	Conv.Cathode Bypass - Cer.
42	47	500	RCW-1052	1FM-45	1468-0005	5W5Q5	MO.5-45	RF Bypass - Cer.
43	6	500	RCW-1050	MS-55	1468-000005	5W5V5	MO.5-55	Feedback - Cer.
44	10	500	UCW-2004	MS-41	1468-00001	5W5Q1	MO.5-41	OSC Grid Cap - Cer.
45	10	500	UCW-2004	MS-41	1469-00001	5R5Q1	MO8.5-41	Fixed Trimmer - Cer.
46	22	500	RCW-1053	MS-42	1468-000025	5W5Q2	MO.5-425	OSC Grid Cap - Cer.
47	10	500	RCW-020	MS-41	1468-00001	5W5Q1	MO.5-41	RF Coupling - Cer.
48	20.5	500	RCW-1056					Fixed Trimmer - Cer.
49	4.7	500						" " -Cer.
50	47	500	RCW-1052	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling - Cer.
51	470	500	UCW-044	1FM-35	1468-0005	5W5T5	MO.5-35	RF Screen Bypass - Cer.
52	47	500	RCW-1052	1FM-45	1468-00005	5W5Q5	MO.5-45	Ant. Coupling - Cer.
53	3	500	RCW-1048					" " - Cer.
54	15.3	500	RCW-1054					Fixed Trimmer - Cer.
55	470	500	UCU-044					RF Bypass
56	47	500	UCU-020					Line Ant. Coupling
57	470	500	UCW-044					Filament Bypass - Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

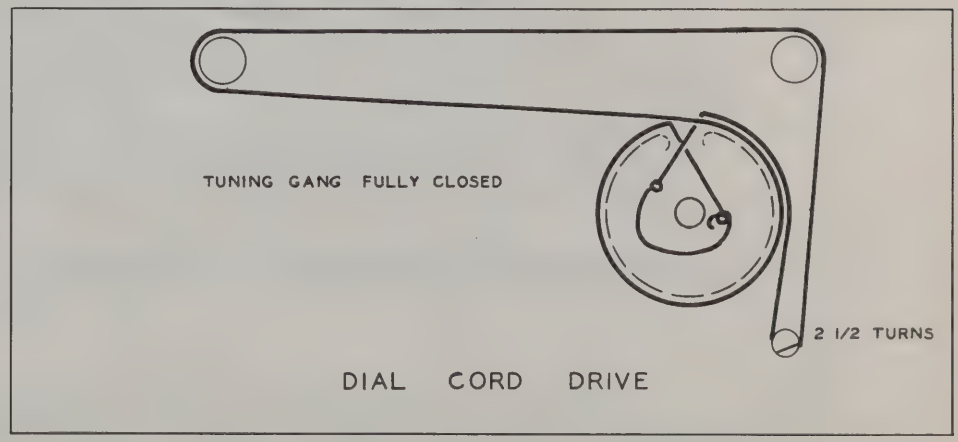
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: MEISSNER PART No.	
97	Loop Ant.	.1Ω	1.4Ω	RLX-015		
98	FM Ant.Coil		0Ω			
99	BC RF Coil	63Ω	4.5Ω	RLB-024		
100	FM RF Coil		0Ω			
101	BC OSC Coil		7Ω	RLC-060	14-1060	
102	FM OSC Coil		0Ω			
103A	AM 1st IF	‡11Ω	10.5	RTL-062		Includes both primaries.
B	FM 1st IF		.2Ω			
104A	AM 2nd IF		#26Ω	RTL-072		Includes both secondaries.
B	FM 2nd IF	.4Ω				
105A	AM 3rd IF	‡11Ω	11Ω	RTL-064		Includes both primaries.
B	FM 3rd IF		.4Ω			
106	FM Disc.	.5	.7Ω	RTD-006		
107	Plate Choke		.8Ω	RLA-012		
108	FM Choke		.8Ω	RLA-012		
109	FM Choke		.8Ω	RLA-012		
110	FM Choke		.1Ω	RLF-012		
111	Line Choke		.1Ω	RLI-044		
112	Fil. Choke		.1Ω	RLI-005		
113	Fil. Choke		.1Ω	RLI-005		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA	INSTALLATION NOTES
114	Bayonet	6-8V.	0.15A	Brown			Type 47
115	Bayonet	6-8V	0.15A	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	GENERAL ELECTRIC PART No.	NOTES
116	Switch	RSW-049	Band
117	"	RSW-050	Tone
118	3 Gang Var. Cap.	RCT-028	(22-492MMF, 17-294MMF, 19-135MMF)
A14	Trimmer	RCY-038	FM Osc. Adj.
A19	"	RCY-016	BC Ant. Adj.
	Dial Scale	RDS-065	Models 356, 357, 358
	" "	RDS-066	Model 359
	Dial Pointer	RDX-039	



DIAL CORD DRIVE

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GENERAL ELECTRIC PART No.	IRC PART No.	CLAROSTAT PART No.	
58	2 Meg.	½	RRC-076			Volume Control & SW tapped @ 1 Meg. Origianl Part #M760165-27

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GENERAL ELECTRIC PART No.	IRC PART No.	
59	33KΩ	½	URD-085	BTS-33K	Or.-Or.-Or. Antenna Loading
60	470Ω	½	URD-041	BTS-470	Yl.-Vi.-Br. Series Antenna
61	47kΩ	½	URD-081	BTS-47K	Yl.-Vi.-Or. RF Grid
62	470Ω	½	URD-041	BTS-470	Yl.-Vi.-Br. RF Decoupling
63	1Ω	½	URD-005		Br.-Grn.-Blk. Parasitic Suppressor
64	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
65	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. " "
66	1800Ω	½	URD-055	BTS-1800	Br.-Gray-Red Parasitic Suppressor
67	22KΩ	½	URD-081	BTS-22K	Red-Red-Or. Oscillator Grid
68	22Ω	½	URD-033		Red-Red-Br. Decoupling
69	470Ω	½	URD-041	BTS-470	Yl.-Vi.-Br. "
70	1000Ω	½	URD-049	BTS-1000	Br.-Blk.-Red " "
71	68Ω	½	URD-021		Blue-Gray-Blk. 1st IF Cathode
72	220Ω	½	URD-033		Red-Red-Br. 2nd IF Cathode
73	2200Ω	½	URD-057	BTS-2200	Red-Red-Red 2nd IF Decoupling
74	100KΩ	½	URD-097	BTS-100K	Br.-Blk.-Yl. FM Limiter Grid
75	33KΩ	½	URD-085	BTS-33K	Or.-Or.-Or. FM Limiter Decoupling
76	68KΩ	½	URD-093	BTS-68K	Blue-Gray-Or. De-emphasis
77	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Discriminator Diode Load
78	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl " " "
79	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
80	220KΩ	½	URD-105	BTS-220K	Red-Red-Yl. Diode Load
81	47KΩ	½	URD-089	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
82	47KΩ	½	URD-089	BTS-47K	Yl.-Vi.-Or. " "
83	100KΩ	½	URD-097	BTS-100K	Br.-Blk.-Yl. Tone Compensation
84	6.8 Meg.	½	URD-141	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
85	330KΩ	½	URD-109	BTS-330K	Or.-Or.-Yl. AF Plate Load
86	47KΩ	½	URD-089	BTS-47K	Yl.-Vi.-Or. Tone Compensation
87	22Ω	½	URD-009	BW-½-22	Red-Red-Blk. Parasitic Suppressor
88	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Output Grid
89	150Ω	1	URE-029	BW-1-150	Br.-Grn.-Br. Output Cathode
90	330Ω	1	URE-037	BW-1-330	Or.-Or.-Br. Filter
91	330Ω	1	URE-037	BW-1-330	Or.-Or.-Br. "
92	18Ω	1	RRW-008	BW-1-18	Br.-Gray-Blk Surge Limiter
93A	30Ω	10	RRW-025	ABA-100	Pilot Light Shunt - See Note
B	70Ω				Line Dropping

Note: On IRC Replacement Set Slider at 30Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GENERAL ELECTRIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
94	2000Ω	3.5Ω	229Ω tapped @ 3Ω	.6Ω	RTO-044	A-3876*		A-2928*	*File mounting holes to fit replacement. Add extra filter to reduce hum level.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GENERAL ELECTRIC PART No.	JENSEN PART No.	QUAM PART No.	
95	FIELD	VC IMP.	UOP-527	ST-107† Mod.P5-V	52A15	Original Part No.S5256-9 †Use Adaptor baffle.
	PM	3.5Ω				
96	CONE DIA.	VC DIA.				
	5¼ in.	½ in.				

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	6AG5	-.7VDC	0V.	25VAC	32VAC	97VDC	97VDC	0V.	-	-
	2	6BE6	-7VDC§	0V.	38VAC	32VAC	97VDC	97VDC	-.5VDC	-	-
	3	6BA6	-1.7VDC	0V.	25VAC	19VAC	90VDC	90VDC	.6VDC	-	-
	4	6AU6	0V.	1VDC	19VAC	12VAC	67VDC	67VDC	1VDC	-	-
‡	5	6AU6	-.2VDC	0V.	12VAC	6.5VAC	30VDC	30VDC	0V.	-	-
‡	6	6S8GT	-.4VDC	0V.	-2VDC	-.5VDC	0V.	65VDC	0V.	6.5VAC	-.5VDC
	7	25L6GT	0V.	60VAC	115VDC	100VDC	0V.	0V.	38VAC	7VDC	-
	8	25Z5GT	0V.	60VAC	117VAC	125VDC	117VAC	125VDC	90VAC	125VDC	-

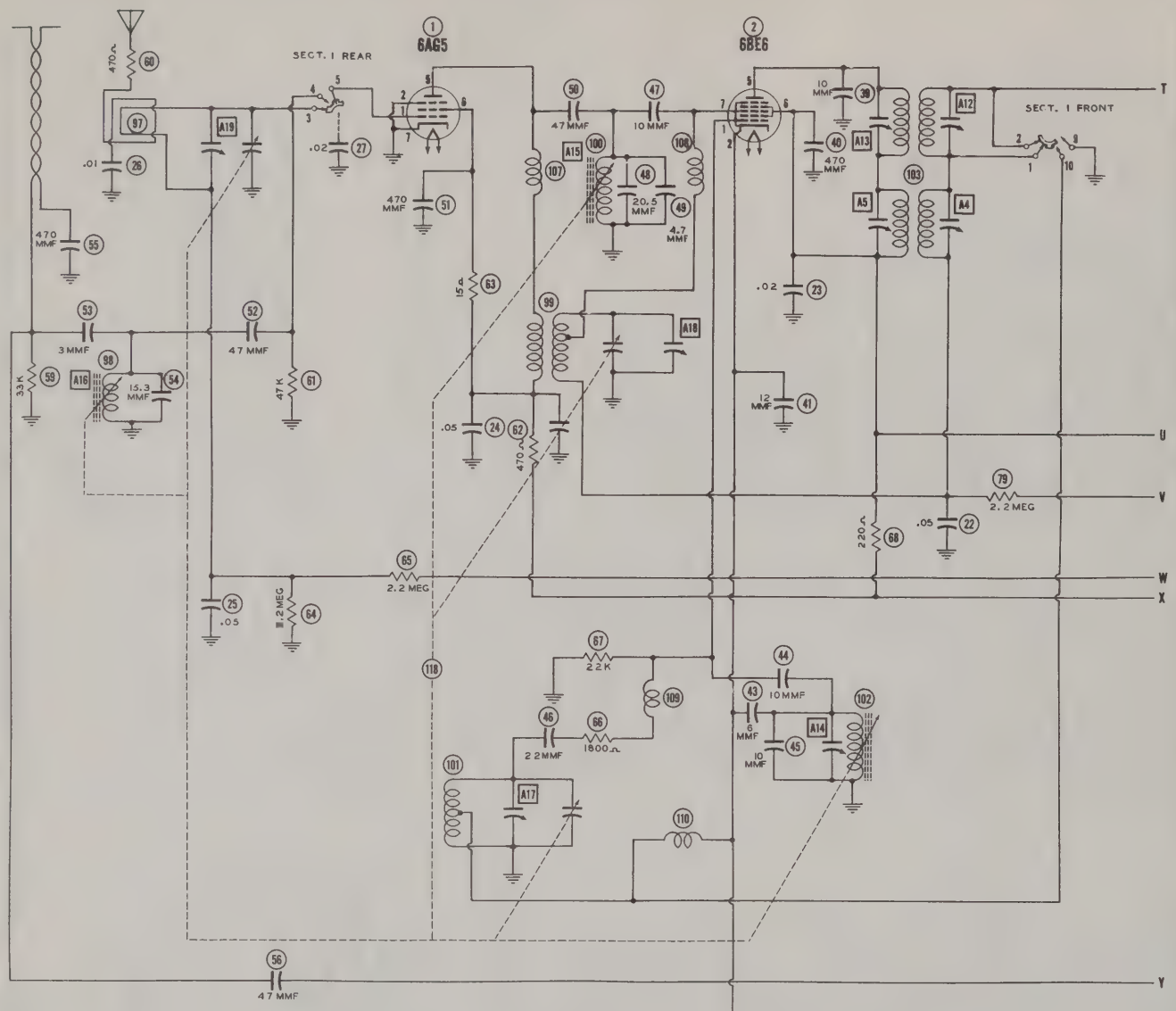
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
	1	6AG5	1.5 Meg.	0Ω	17Ω	21Ω	200KΩ	200KΩ	0Ω	-	-
	2	6BE6	22KΩ	.1Ω	26Ω	21Ω	200KΩ	200KΩ	2.5 Meg.	-	-
	3	6BA6	2.5 Meg.	0Ω	17Ω	12Ω	200KΩ	200KΩ	68Ω	-	-
	4	6AU6	26Ω	220Ω	12Ω	8Ω	200KΩ	200KΩ	220Ω	-	-
‡	5	6AU6	100KΩ	0Ω	8Ω	3.5Ω	230KΩ	230KΩ	0Ω	-	-
‡	6	6S8GT	220KΩ	0Ω	470KΩ	470KΩ	940KΩ	530KΩ	0Ω	3.5Ω	7 Meg.
	7	25L6GT	INF.	37Ω	200KΩ	200KΩ	490KΩ	490KΩ	26Ω	150Ω	-
	8	25Z5GT	INF.	37Ω	121Ω	200KΩ	121Ω	200KΩ	50Ω	200KΩ	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



STAGE GAIN MEASUREMENTS			
ANTENNA TO RF GRID	6X		600KC
RF GRID TO CONVERTER GRID	10X		600KC
CONVERTER GAIN	20X	IN	600KC
		OUT	455KC
CONVERTER PLATE TO 2nd IF GRID	35X		455KC
2nd IF TUBE	250X		455KC
3rd IF TRANS.	.65X		455KC
AUDIO	40X		400~
OUTPUT	20X		400~

IF = 455KC AM

IF = 10.7MC FM

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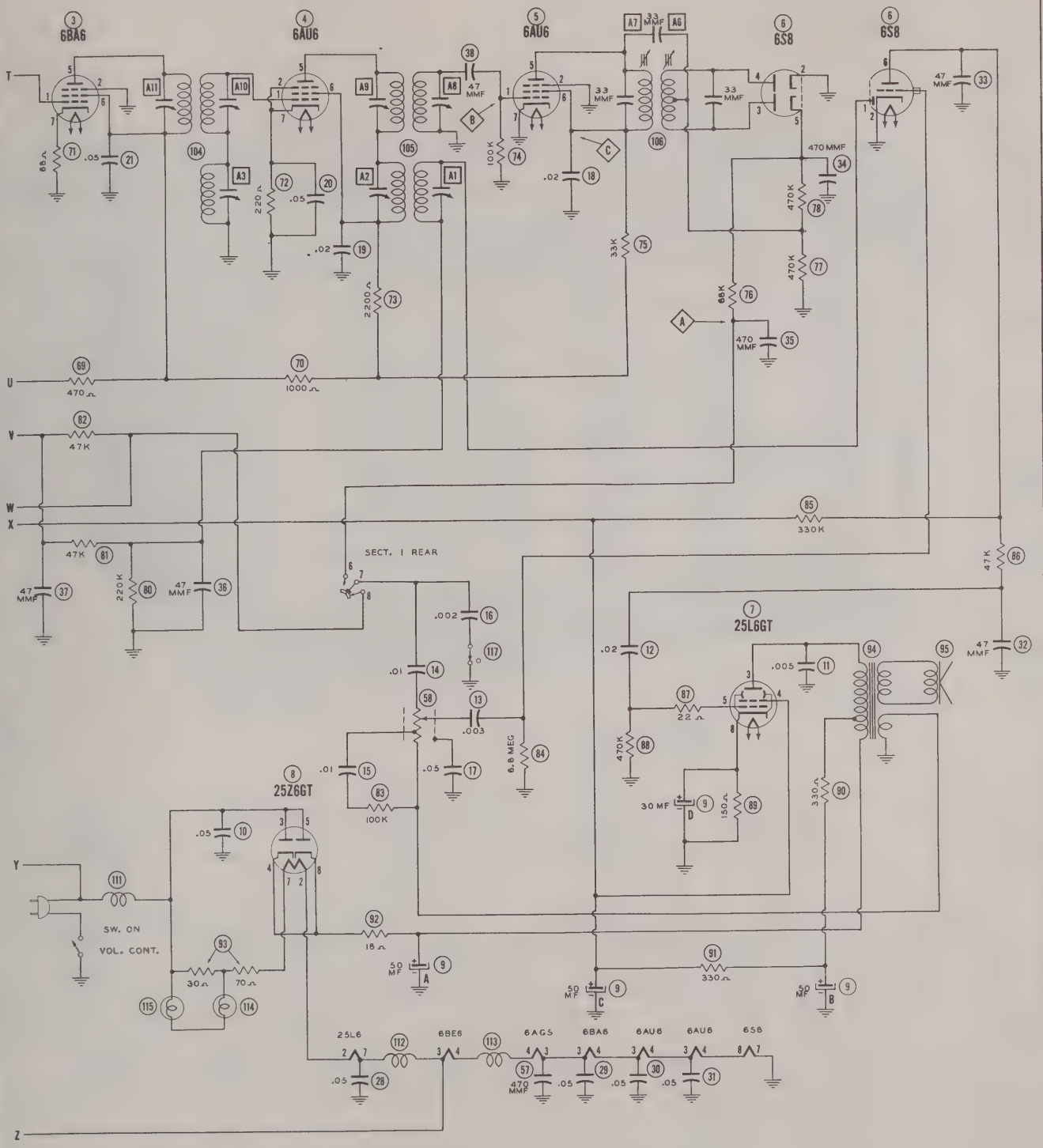
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning cap. fully closed and mark position of pointer. This is index mark referred to in Steps 9 & 12 below.

Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Attenuate output of signal generator to obtain maximum meter reading of 2 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to Pin 1 (grid) 6AU6 2nd IF Tube (4). Low side to chassis.	455KC (400~ Amp. modulated)	BC (Right)	Tuning cap. fully open.	Across voice coil	A1,A2,	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.01 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A3	Adjust for maximum output.
3	.01 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	"	A4,A5	" " " "

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator. In Step 6 the 200KΩ resistor should be connected directly to Pin 1 (grid) of 6AU6 3rd IF Tube (5) with as short connections as possible.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.01 MFD.	High side to Pin 1 (grid) 6AU6 3rd IF Tube (5). Low side to chassis.	10.7MC (unmodulated)	FM (left)	Tuning cap. fully open.	DC probe to Point Ⓐ Common to chassis.	A6	Adjust for zero deflection.
5	.01 MFD.	"	(See Remarks)	"	"	"	A7	Detune signal generator to point of maximum deflection. Adjust A7 for maximum deflection.
6	.01 MFD.	High side to Pin 1 (grid) 6AU6 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	"	"	DC probe in series with 200K ohm resistor to Point Ⓑ. Common to chassis.	A8, A9	Adjust for maximum deflection. Attenuate sig. gen. to obtain maximum of 1 volt meter reading.
7	.01 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A10,A11	"
8	.01 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	"	A12,A13	Adjust for maximum deflection. Attenuate sig. gen. to obtain maximum of 1 volt meter reading. Continue with FM RF alignment Step 9.

FIG. 1

FIG. 2

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

Set vertical gain in scope to maximum and attenuate signal from signal generator to give just enough deflection to obtain pattern.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulated)	FM (left)	Tuning cap. fully open.	Vertical input in series with .1 MFD cap. to Point Ⓓ. Ground to chassis	A8,A9, A10,A11	Adjust for maximum, amplitude, symmetry and coincidence of pattern per Fig. 1.
5	.01 MFD	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	"	A12, A13	"
6	.01 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	Vertical input to Point Ⓐ. Ground to chassis.	A7,A6	Alternately adjust A7 for maximum amplitude and A6 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM RF Alignment, Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	Direct	Across FM Dipole terminals.	98MC (unmodulated)	FM	3-7/32" from index mark.	DC probe in series with 200K ohm resistor to Point Ⓑ. Common to chassis.	A14	Loosen A14 to minimum capacity and tighten to first peak. Adjust for maximum deflection.
10	Direct	"	"	"	Tune for maximum deflection.	"	A15	Rock tuning control and adjust for maximum output. Repeat Steps 9 & 10 until no further improvement can be made.
11	Direct	"	"	"	"	"	A16	Adjust for maximum deflection. Repeat Steps 9, 10 & 11.

AM RF ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
12		Loop	1500KC	BC	5" from index mark.	Across voice coil	A17	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
13		"	"	"	Tune for maximum output.	"	A18	Rock tuning control and adjust for maximum output. Repeat Steps 12 & 13 until no further improvement can be made.
14		"	"	"	"	"	A19	Adjust for maximum output.

GENERAL IMPLEMENT
MODEL 9A5

GENERAL IMPLEMENT
MODEL 9A5

GENERAL IMPLEMENT (GI) MODEL 9A5

TRADE NAME	General Implement (GI) Model 9A5
SUPPLIER	General Implement Corp., Terminal Tower, Cleveland 13, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver - Self Contained Loop Antenna
TUBES	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .245 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning cap fully closed and set pointer to last reference mark at low freq. end of dial. Use isolation transformer if available. If not, connect a capacitor in series with low side of signal generator and chassis. Volume should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	Tuning cap. open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

GENERAL IMPLEMENT
MODEL 9A5

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7GT	12SK7GT	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	3-1	EL-24	AF88D	UP4215	DY-4020-150	■ Filter
B	20	150						▲ Filter
7	.1	200		TC-1	484-.1	DT4P1	ST-4-1	Line Filter
8	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.01	400		TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.01	400		TC-11	484-01	DT4S1	ST-4-01	" "
11	.05	200		TC-15	484-05	DT4S5	ST-4-05	AVC Filter
12	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	Audio Plate Bypass
13	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	IF Bypass Vol. Cont.
14	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	OSc. Grid Capacitor

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
15A	500KΩ	1	20-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

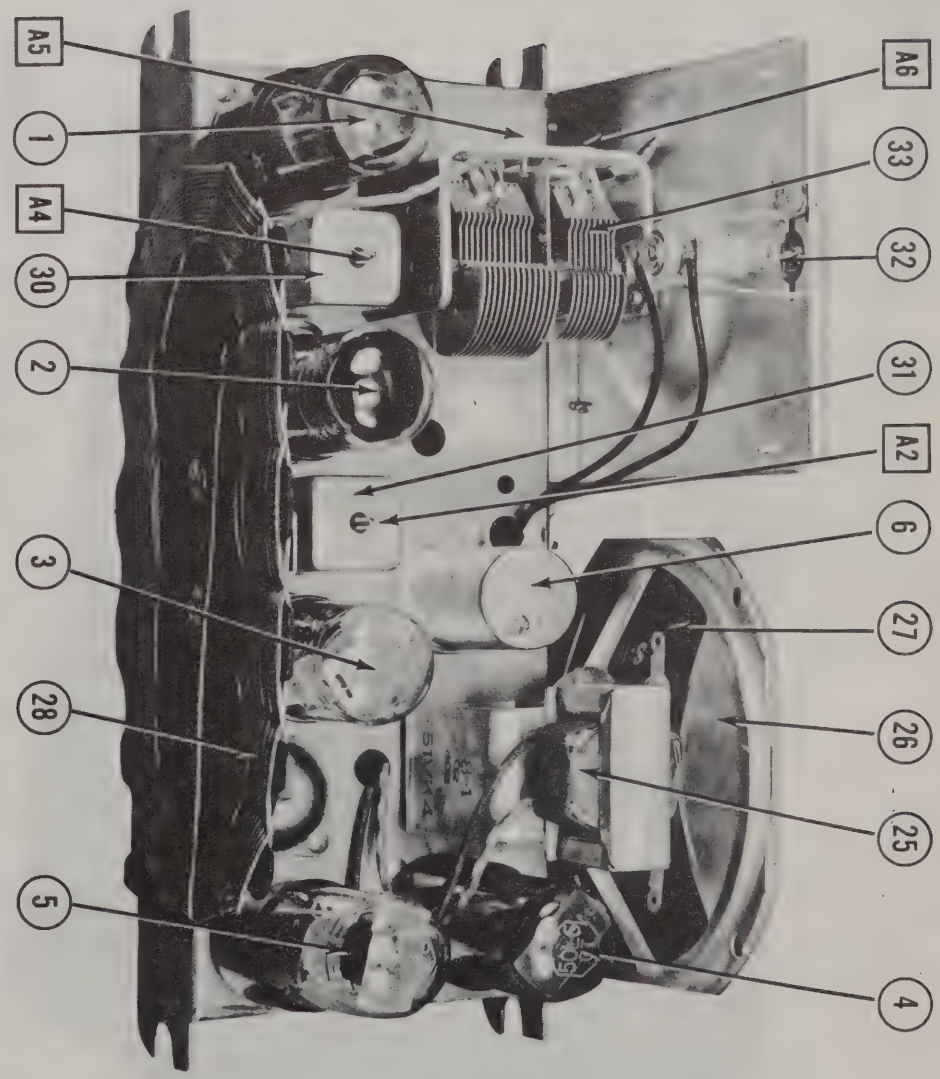
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
16	20KΩ	¼		BTS-22K	Red-Blk.-Or. Oscillator Grid
17	10 Meg.	¼		BTS-10 Meg.	Br.-Blk.-Blue AVC Network
18	1 Meg.	¼		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network-See Note
19	6 Meg.	¼		BTS-5.6 Meg.	Blue-Blk.-Grn. AF Grid
20	500KΩ	¼		BTS-470K	Grn.-Blk.-Yl. AF Plate Load
21	500KΩ	¼		BTS-470K	Grn.-Blk.-Yl. Output Grid
22	150Ω	¼		BW-½-150	Br.-Grn.-Br. Output Cathode
23	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
24	10Ω	½		BW-½-10	Br.- Blk.-Blk.- Line Dropping

Note- Some models use 2 Meg. in this application. IRC replacement BTS 2.2 Meg.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
25	2400Ω	3.2Ω	150Ω	.52	Part of 8-1	A-3786*	T22845*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105‡		‡Drill and tap magnet frame.
26	PM	3.2Ω	8-1	Mod. P5-X	5AQ7§	§Drill new mounting holes.
	CONE DIA.	VC DIA.				
27	4-5/8"	1/2"				

R F COILS

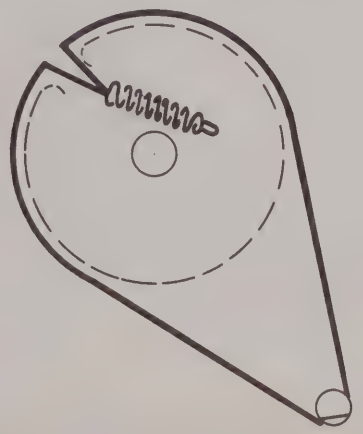
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.	MEISSNER PART No.
28	Loop Ant.		1.2Ω	32-5	
29	Osc. Coil	1Ω	6Ω	14-1	14-1040
30	Input IF	10.5Ω	10Ω	15-3	16-6668
31	Output	10.5Ω	10.5Ω	15.3	16-6669

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GENERAL IMPLEMENT PART No.		INSTALLATION NOTES
32	Bayonet	6-8	0.15	Brown			Type 47

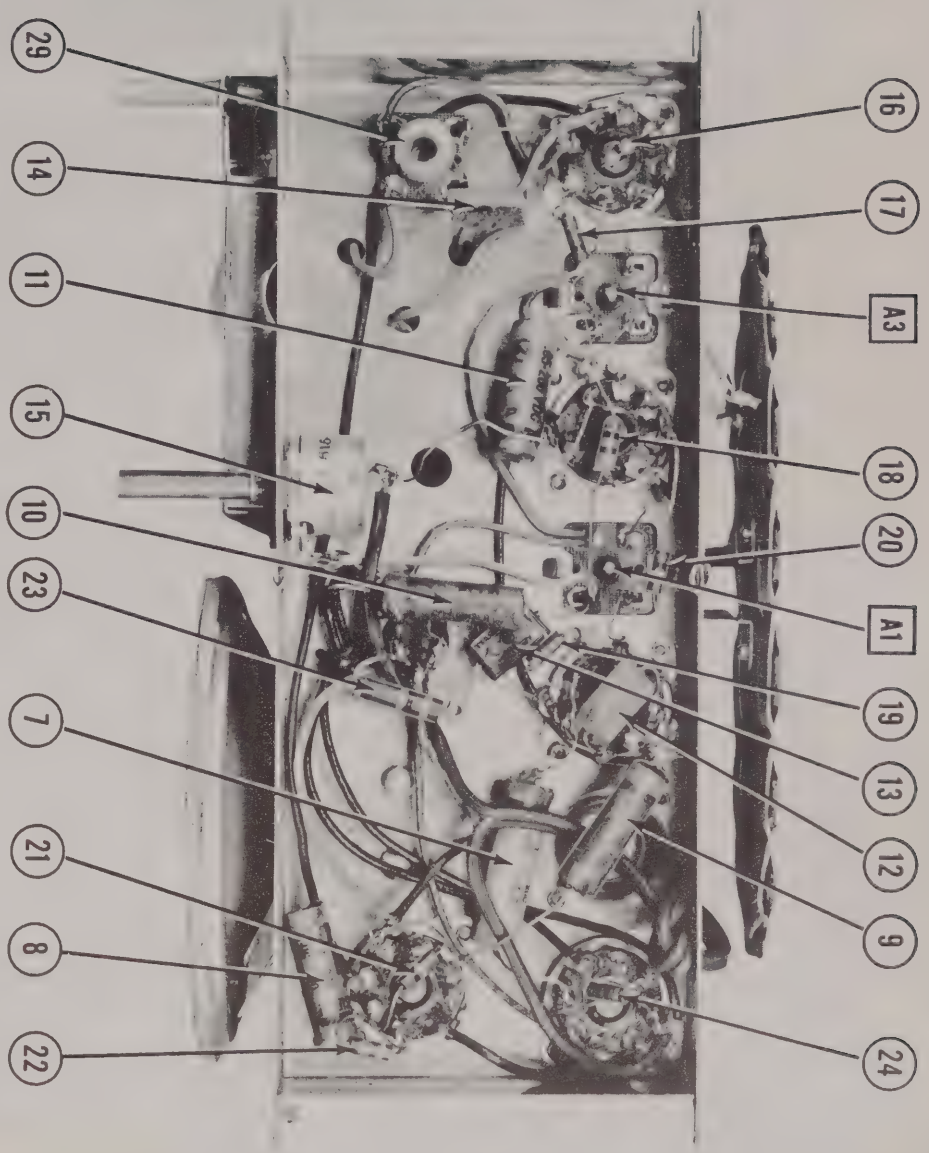
MISCELLANEOUS

ITEM No.	PART NAME	GENERAL IMPLEMENT PART No.	NOTES
33	2 Gang Var.Cap.	6-1	28-474 MMF, 32-195 MMF

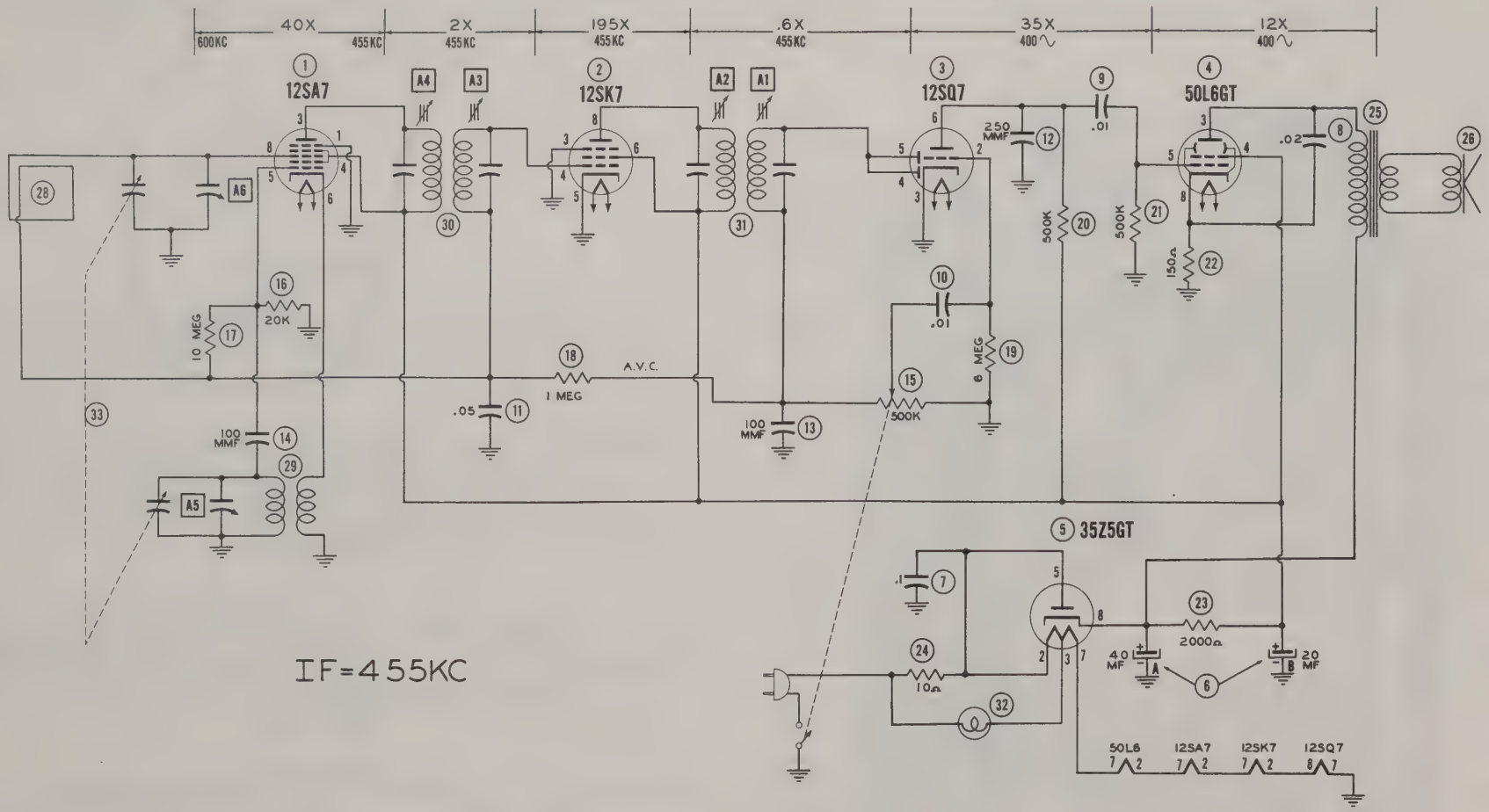


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



GENERAL IMPLEMENT MODEL 9A5



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	25VAC	92VDC	92VDC	-8.6VDC§	0V.	37VAC	-.63VDC
2	12SK7GT	0V.	13VAC	0V.	-.63VDC	0V.	92VDC	25VAC	92VDC
3	12SQ7GT	0V.	-.68VDC	0V.	-.53VDC	-.53VDC	38VDC	13VAC	0V.
4	50L6GT	0V.	37VAC	128VDC	92VDC	0V.	0V.	88VAC	5.9VDC
5	35Z5GT	0V.	117VAC	113VAC	0V.	117VAC	117VAC	88VAC	135VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	24Ω	95KΩ	95KΩ	18KΩ	.8Ω	36Ω	1.1 Meg.
2	12SK7GT	0Ω	12Ω	0Ω	1.1 Meg.	0Ω	95KΩ	24Ω	95KΩ
3	12SQ7GT	0Ω	4 Meg.	0Ω	480KΩ	480KΩ	700KΩ	12Ω	0Ω
4	50L6GT	0Ω	36Ω	95KΩ	95KΩ	500KΩ	INF.	80Ω	135Ω
5	35Z5GT	INF.	108Ω	102Ω	INF.	108Ω	108Ω	80Ω	95KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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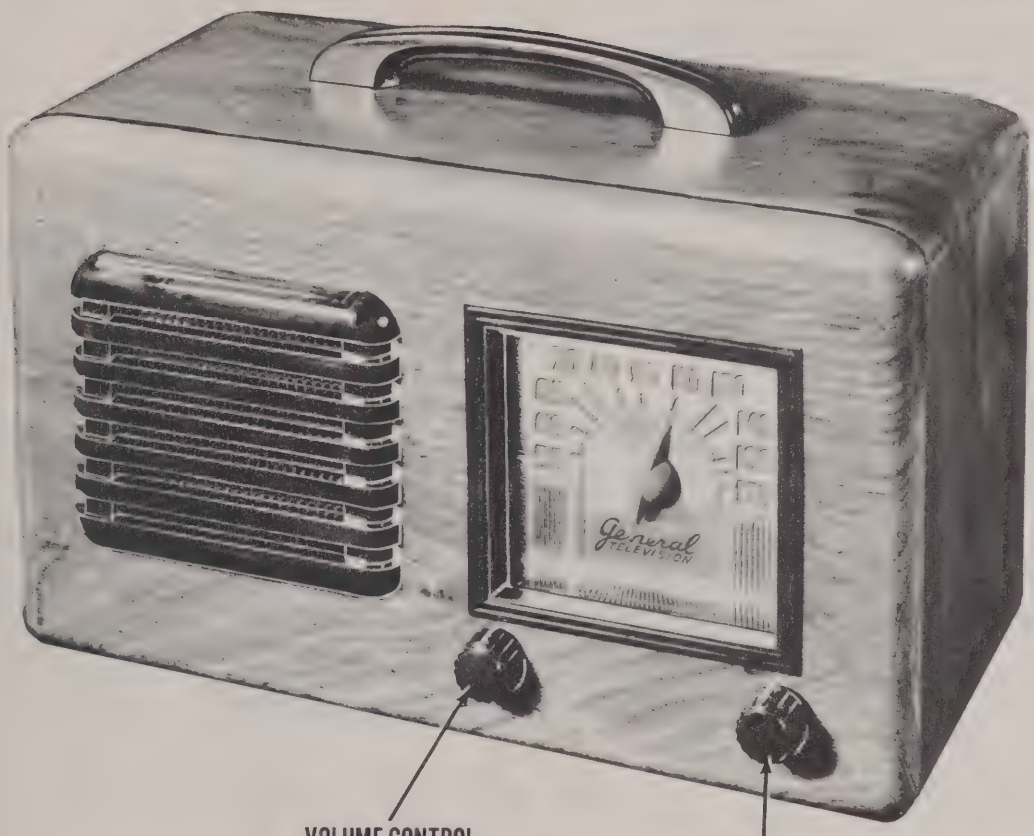
487-7

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GENERAL TELEVISION
MODEL 24B6



GENERAL TELEVISION
MODEL 24B6

GENERAL TELEVISION MODEL 24B6

TRADE NAME	General Television, Model 24B6
MANUFACTURER	General Television & Radio Corp., 2701 Lehmann St., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SA7GT Converter, 12SK7GT IF Amp., 12SQ7GT Det.-AVC, 12SQ7GT AF Amp., 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .240 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to stator of rear section of tuning capacitor. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

GENERAL TELEVISION MODEL 24B

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. TELE. PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter		12SA7GT	8AD	
2	IF Amp.		12SK7GT	8N	
3	Det.-AVC		12SQ7GT	8Q	
4	AF Amp.		12SQ7GT	8Q	
5	Power Output		35L6GT	7AC	
6	Rectifier		35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. TELE. PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	3-3	TA-240	PRSA150-20-40	BRD4215	DSB-2x30-150	Filter - Red
B	20	150						" - Blue
8	.1	600		TC-1	684-.1	DT6P1	MPH-6-1	Line Filter
9	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
10	.01	400		TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
11	.01	400		TC-11	484-01	DT4S1	ST-4-01	" "
12	.05	600		TC-15	684-05	DT6S5	ST-6-05	AVC Network
13	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
14	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode Filter
15	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. TELE. PART No.	MALLORY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	20-1	MR-48	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	Not Req.	A	Not Req.	Attach to 16A per instructions
C	Switch		" "	M-26	41	SW-A	" " " " "

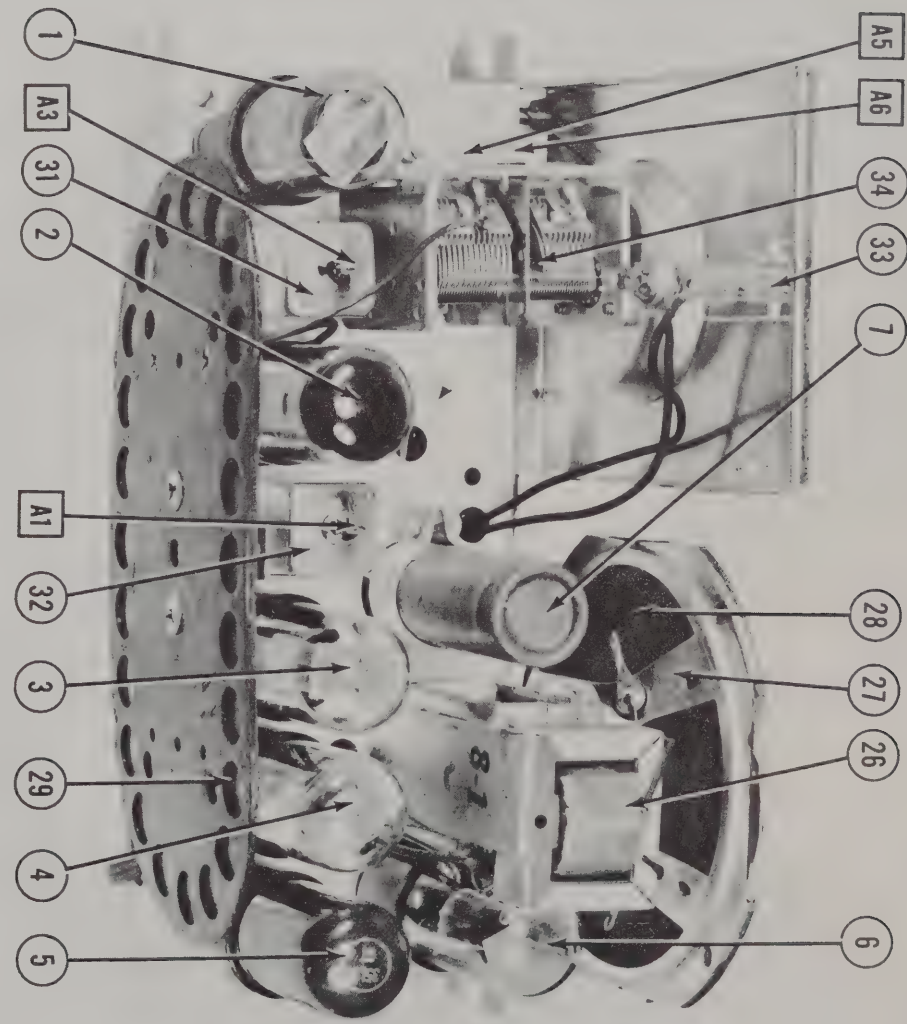
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. TELE. PART No.	IRC PART No.	IDENTIFICATION CODES
17	20KΩ	½		BTS-22K	Red-Blk.-Or. Oscillator Grid
18	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AVC Network
19	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
20	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
21	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. AF Plate Load
22	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Output Grid
23	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
24	2000Ω	1		BTA-2200	Red-Blk.-Red Filter
25	10Ω	½		BW-½-10	Br.-Blk.-Blk. Rectifier

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GEN. TELE. PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
26	2100Ω	3.0Ω	170Ω	.52	Part of 8-1	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA GEN. TELE. PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
27	FIELD PM	VC IMP. 3.0Ω	8-1	ST-107† Mod. P5-V	5A15†	†Fabricate new mounting bracket.
28	CONE DIA. 4½"	VC DIA. 1/2"				

R F COILS

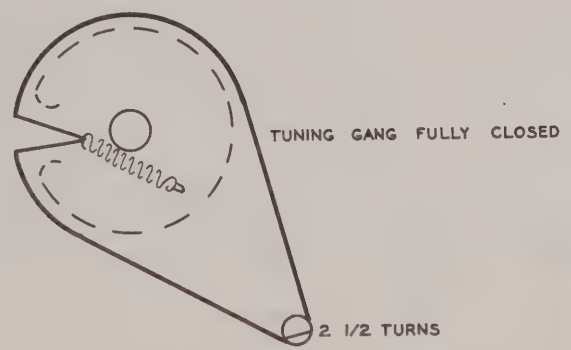
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA GEN. TELE. PART No.	REPLACEMENT DATA MEISSNER PART No.
29	Loop Ant.		1.5Ω	32-5A	
30	Osc. Coil	1.5Ω	6Ω	14-1	14-1040
31	Input IF	16Ω	16Ω	15-3	16-6668
32	Output IF	16Ω	16Ω	15-3	16-6669

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA GEN. TELE. PART No.		INSTALLATION NOTES
33	Bayonet	6-8	0.15	Brown			Type 47

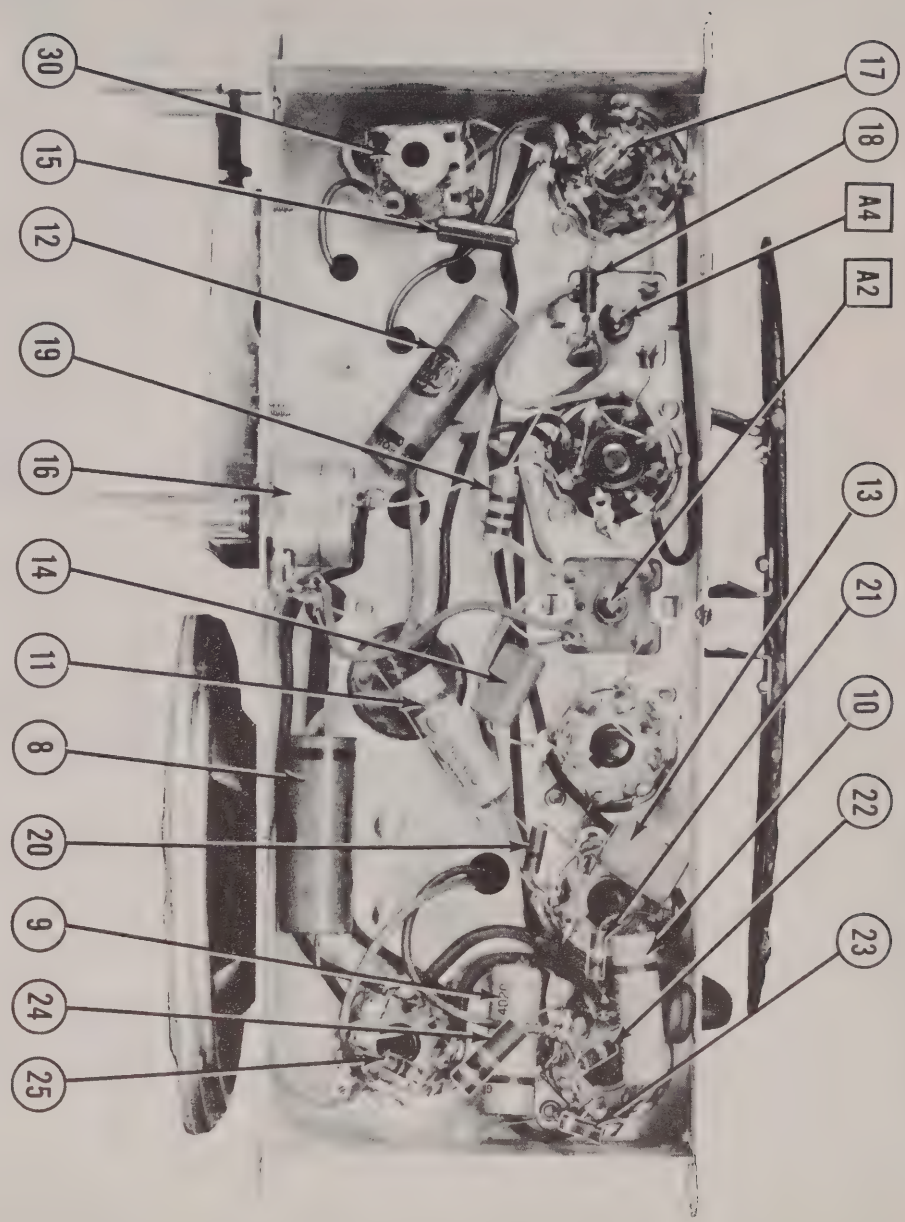
MISCELLANEOUS

ITEM No.	PART NAME	GEN. TELE. PART No.	NOTES
34	2 Gang Var. Cap	6-1A	25-474MMF, 33-191MMF



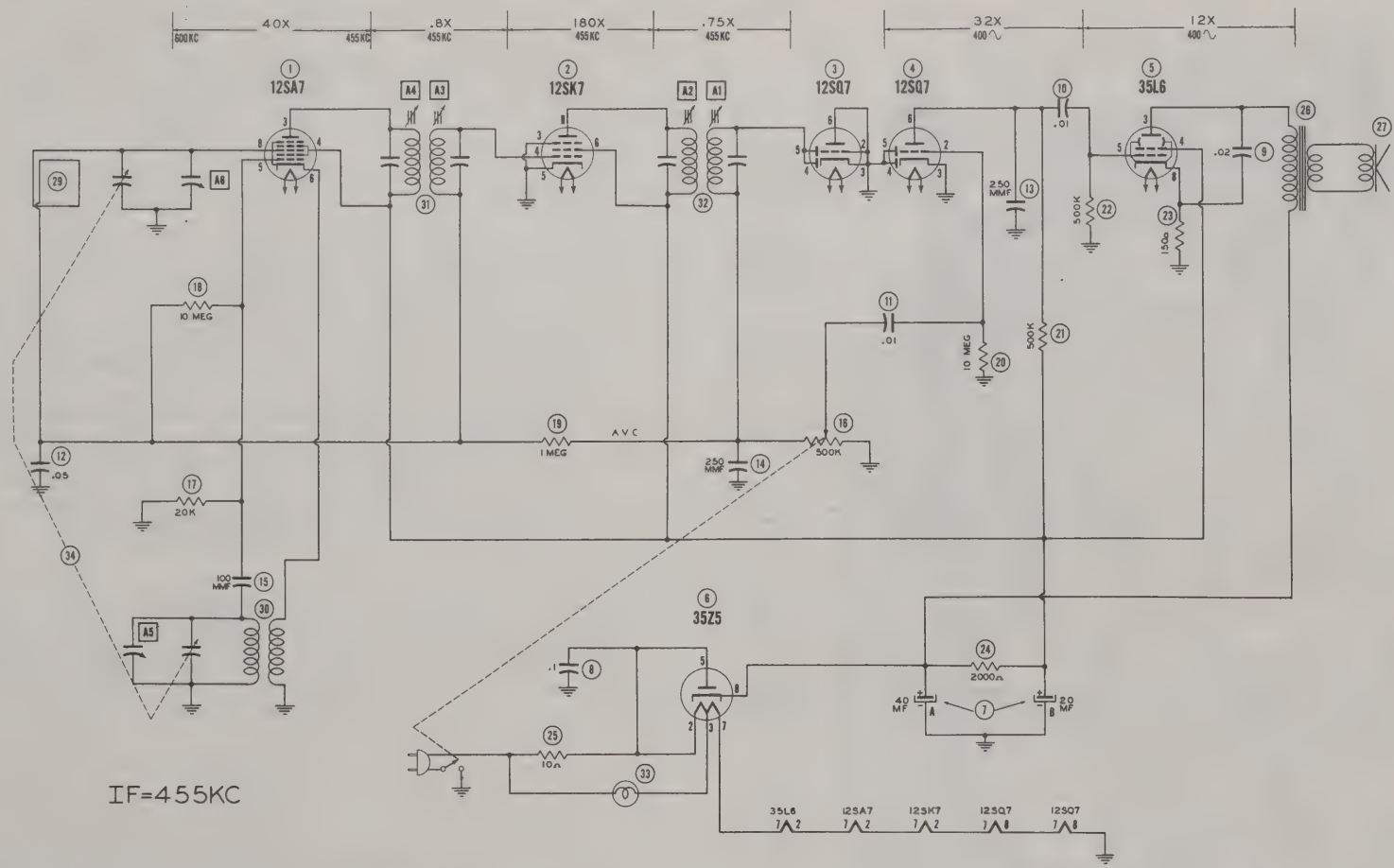
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



GENERAL TELEVISION MODEL 24B6

GENERAL TELEVISION MODEL 24B6



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	39VAC	80VDC	80VDC	-11VDC‡	0V.	52VAC	-1.1VDC
2	12SK7GT	0V.	27VAC	0V.	-1.1VDC	0V.	80VDC	39VAC	80VDC
3	12SQ7GT	0V.	0V.	0V.	-.7VDC	-.7VDC	0V.	27VAC	13VAC
4	12SQ7GT	0V.	-.6VDC	0V.	0V.	0V.	45VDC	13VAC	0V.
5	35L6GT	0V.	52VAC	118VDC	80VDC	0V.	0V.	87VAC	[illegible]
6	35Z5GT	0V.	115VAC	113VAC	0V.	115VAC	117VAC	87VAC	125VDC

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	39Ω	150Ω	150KΩ	19KΩ	1Ω	53Ω	1.4 Meg.
2	12SK7GT	0Ω	8Ω	0Ω	1.4 Meg.	0Ω	150KΩ	39Ω	150KΩ
3	12SQ7GT	0Ω	0Ω	0Ω	[illegible]	500KΩ	0Ω	2Ω	1Ω
4	12SQ7GT	0Ω	1Ω Per.	0Ω	0Ω	0Ω	650KΩ	1Ω	0Ω
5	35L6GT	0Ω	52Ω	150KΩ	1.0MΩ	500KΩ	1MΩ	88Ω	150Ω
6	35Z5GT	INF.	130Ω	130Ω	0Ω	130Ω	115Ω	85Ω	150KΩ

THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY
ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

487-8

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

GON-SET 10-11
METER CONVERTER

GON-SET 10-11
METER CONVERTER

GON-SET 10-11 METER CONVERTER

TRADE NAME	Gon-Set, 10-11 Meter Converter
MANUFACTURER	Waterproof Elect. Co., 70 E. Verdugo Ave., Burbank, Calif.
TYPE SET	10-11 Meter Fixed or Mobile Converter
TUBES (FOUR)	Types, 6AK5 RF Amp., 6AK5 Mixer, 6C4 Oscillator, 0B2 Voltage Regulator
POWER SUPPLY RATING	6.3 Volts "A" Supply and 180 Volts "B" Supply .5 Amp. @ 6.3 Volts AC-DC and .015 Amp. @ 180 Volts DC
TUNING RANGE—	27.5-30.5MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning capacitor to maximum capacity and set pointer parallel to base of dial.

This converter is designed to work into an auxiliary receiver. The IF transformer frequency can be varied from 1500KC to 2000KC. Choice of frequency will be governed by point of least interference in regard to the auxiliary receiver. The 1500KC suggested below is merely an example to be followed, substituting the most satisfactory frequency between 1500 & 2000KC depending on individual locations of the auxiliary receiver.

On the auxiliary receiver volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	1500KC (or selected IF frequency)	Tune auxiliary receiver for maximum output.	Across voice coil of auxiliary receiver.		Fashion a loop of several turns of wire and radiate signal into loop of auxiliary receiver. Tune auxiliary receiver for maximum output & leave receiver unchanged in following alignment Steps of converter.
2	400Ω carbon res.	High side to Pin 1 (grid) 6AK5 converter tube (2). Low side to chassis.	"	Tuning cap. fully closed.	"	A1	Connect output leads from converter to ant. terminals of auxiliary receiver. Adjust for maximum output.
3	"	High side to ant. jack. Low side to chassis.	28.5MC	28.5MC	"	A2	Adjust for maximum output.
4	"	"	"	Tune for maximum output.	"	A3,A4	Rock tuning cap. and adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GON-SET PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6AK5	6AK5	7BD	
2	Mixer	6AK5	6AK5	7BD	
3	Oscillator	6C4	6C4	6BG	
4	Voltage Reg.	0B2	0B2	5B0	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GON-SET PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
5	10	350		EL-10		UP1AJ57	LDY-10-350	Filter
6	1000	300		1FM-21	1468-001	1W5D1	MW.5-21	Mixer Cathode Bypass
7	1000	300		1FM-21	1468-001	1W5D1	MW.5-21	Mixer Screen Bypass
8	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
9	300	500		1FM-33	1468-0003	5W5T3	MO.5-33	Osc. Plate Decoupling
10	1000	300		1FM-21	1468-001	1W5D1	MW.5-21	RF Plate Decoupling
11	1000	300		1FM-21	1468-001	1W5D1	MW.5-21	RF Screen Bypass
12	1000	300		1FM-21	1468-001	1W5D1	MW.5-21	RF Cathode Bypass

RESISTORS

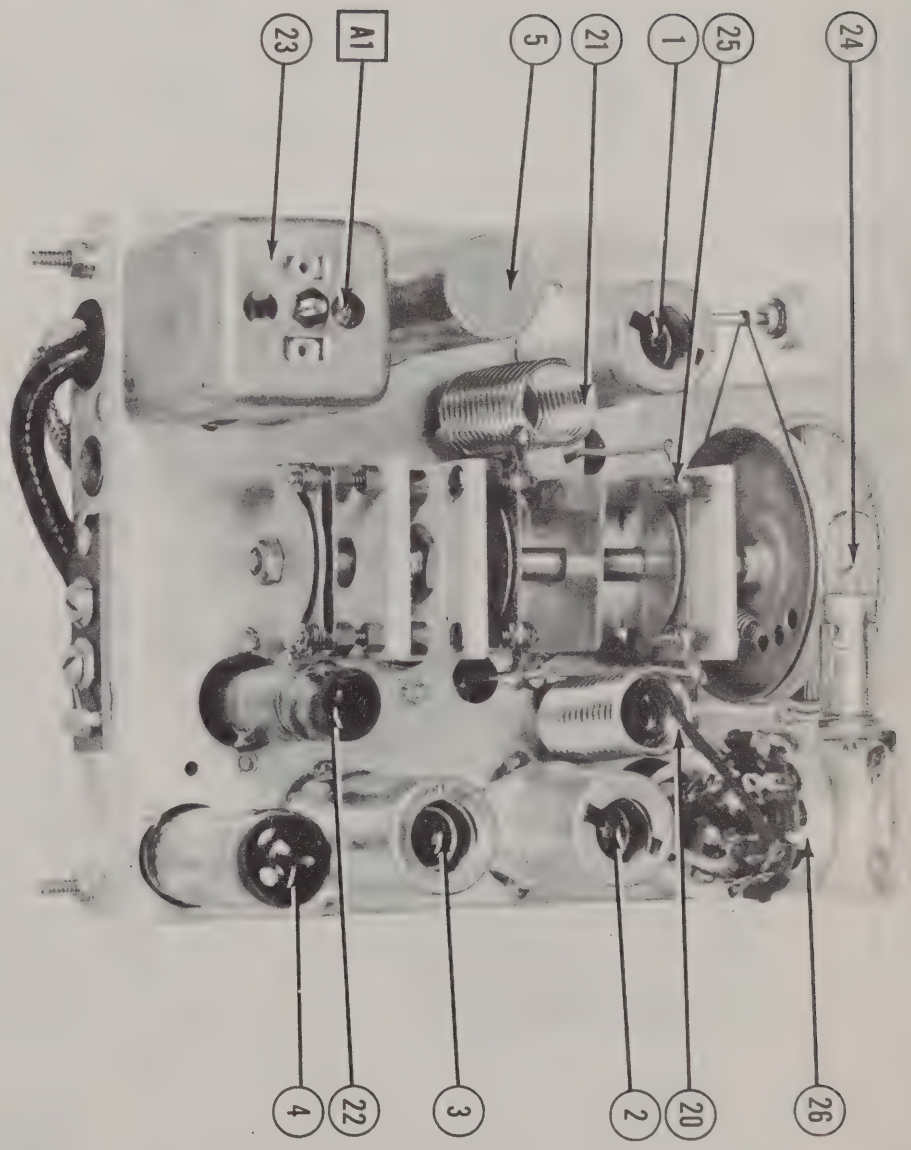
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GON-SET PART No.	IRC PART No.	
13	680Ω	½		BTS-680	Blue-Gray-Br. RF Cathode
14	220KΩ	½		BTS-220K	Red-Red-Yl. RF Screen Dropping-See Note
15	5100Ω	½		BT-2-4700	Grn.-Br. Red RF Plate Decoupling
16	4700Ω	½		BT-2-4700	Yl.-Vi.-Red Voltage Dropping
17	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
18	680Ω	½		BTS-680	Blue-Gray-Br. Converter Cathode
19	220KΩ	½		BTS-220K	Red-Grn.-Yl. Converter Screen Dropping-See Note

Note-Some models use 100KΩ in this application. Replacement same as #17.

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	GON-SET PART No.	MEISSNER PART No.	
20	Ant. Coil	0Ω	0Ω			
21	RF Coil	0Ω	0Ω			
22	Osc. Coil		0Ω			
23	IF Trans.	6Ω	2Ω			

CHASSIS—TOP VIEW



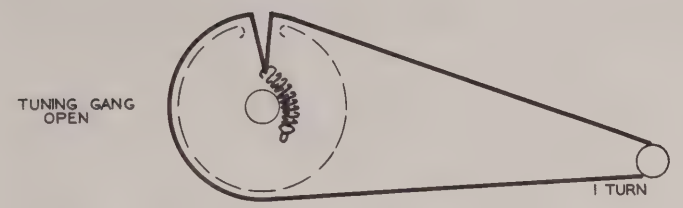
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA GON-SET PART No.		INSTALLATION NOTES
24	Bayonet	6-8	0.15	Brown			Type 47

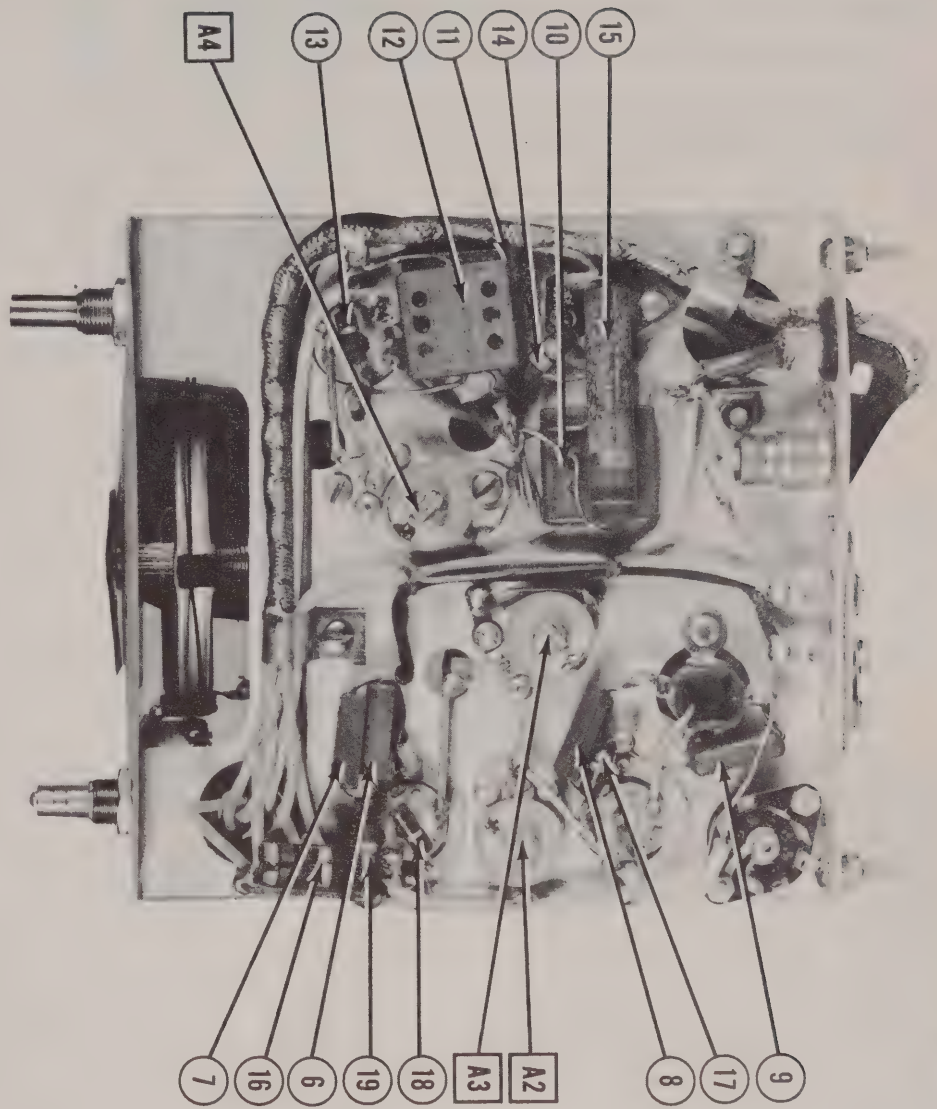
MISCELLANEOUS

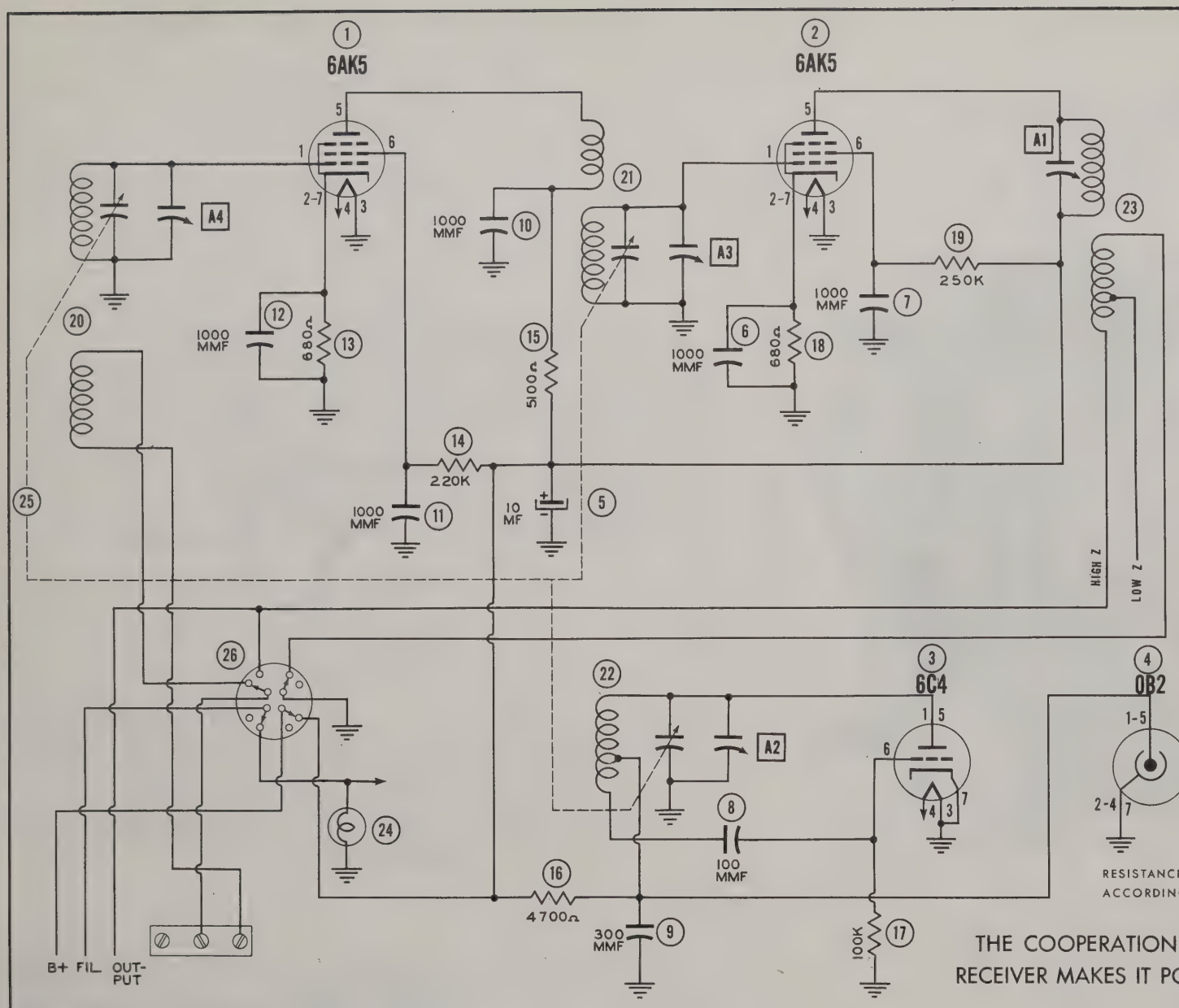
ITEM No.	PART NAME	GON-SET PART No.	NOTES
25 26	2 Gang Var.Cap. Switch		On-Off



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





Pin	6AK5		6AK5	
No.	Volt.	Res.	Volt.	Res.
1	0V.	0Ω	0V.	0Ω
2	1.5VDC	680Ω	1.3VDC	680Ω
3	0V.	0Ω	0V.	0Ω
4	6.3VAC	1.5Ω	6.3VAC	1.5Ω
5	162VDC	511KΩ	180VDC	505KΩ
6	60VDC	725KΩ	22VDC	725KΩ
7	1.5VDC	680Ω	1.3VDC	680Ω

Pin	6C4		0B2	
No.	Volt.	Res.	Volt.	Res.
1	107VDC	505KΩ	107VDC	505KΩ
2	0V.	INF.	0V.	0Ω
3	0V.	0Ω	0V.	INF.
4	6.3VAC	1.5Ω	0V.	0Ω
5	110VDC	505KΩ	107VDC	505KΩ
6	-6VDC	100KΩ	0V.	INF.
7	0V.	0Ω	0V.	0Ω

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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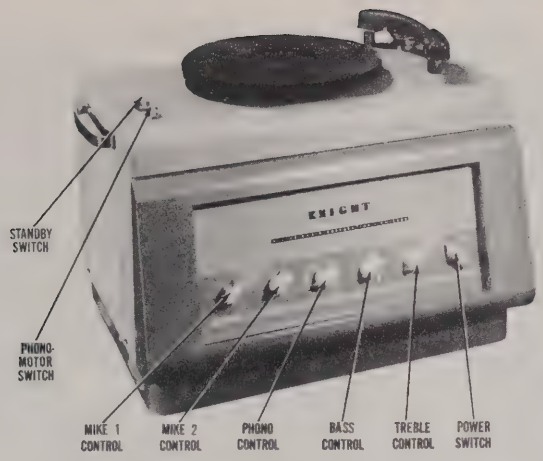
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - "A" Supply maintained at 6.3 Volts AC and "B" Supply maintained at 180 Volts DC for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.



KNIGHT MODEL 93-155

TRADE NAME	Knight, Model 93-155
SUPPLIER	Allied Raio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC or 6 Volt Battery Operated Three Channel Audio Amplifier
TUBES (NINE)	Types, 6SJ7 Mic. 1 Amp., 6SJ7 Mic. 2 Amp., 6SA7 AF Amp., 6SA7 AF Amp., 6SC7 AF Amp.-Phase Inv., (2) 6L6 Power Output, (2) 6X5GT Rectifier.
POWER SUPPLY RATING	105-125 Volts AC or 6 Volt Storage Battery 1.2 Amp. @ 117 Volts AC or 24.5 Amp. @ 6 Volt DC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	3VAC	0V.	*	0V.	20VDC	3VAC	45VDC
2	6SJ7	0V.	3VAC	0V.	*	0V.	20VDC	3VAC	45VDC
3	6SA7	0V.	3VAC	175VDC	30VDC	0V.	2VDC	3VAC	0V.
4	6SA7	0V.	3VAC	175VDC	30VDC	0V.	2VDC	3VAC	0V.
5	6SC7	0V.	220VDC	0V.	0V.	220VDC	2.3VDC	3VAC	3VAC
6	6L6	0V.	3.15VAC	440VDC	360VDC	0V.	0V.	3.15VAC	28VDC
7	6L6	0V.	3.15VAC	440VDC	360VDC	0V.	0V.	3.15VAC	28VDC
8	6X5GT	0V.	3.15VAC	390VAC	0V.	390VAC	0V.	3.15VAC	442VDC
9	6X5GT	0V.	3.15VAC	390VAC	0V.	390VAC	0V.	3.15VAC	442VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	560KΩ
2	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	560KΩ
3	6SA7	0Ω	.1Ω	110KΩ	160KΩ	0Ω	1KΩ	.1Ω	0Ω
4	6SA7	0Ω	.1Ω	110KΩ	160KΩ	0Ω	1KΩ	.1Ω	0Ω
5	6SC7	0Ω	120KΩ	130KΩ	3.9KΩ	120KΩ	1KΩ	.1Ω	.1Ω
6	6L6	0Ω	.1Ω	20KΩ	20KΩ	104KΩ	.1Ω	.1Ω	200Ω
7	6L6	0Ω	.1Ω	20KΩ	20KΩ	100KΩ	INF.	.1Ω	200Ω
8	6X5GT	INF.	.1Ω	130Ω	INF.	130Ω	INF.	.1Ω	20KΩ
9	6X5GT	INF.	.1Ω	125Ω	INF.	125Ω	INF.	.1Ω	20KΩ

*DO NOT MEASURE

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

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KNIGHT MODEL 93-155
KNIGHT MODEL 93-155

PARTS LIST AND DESCRIPTIONS

KNIGHT MODEL 35-135

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. 1 Amp.	6SJ7	6SJ7	8N	
2	Mic. 2 Amp.	6SJ7	6SJ7	8N	
3	AF Amp.	6SA7	6SA7	8R	
4	AF Amp.	6SA7	6SA7	8R	
5	AF Amp.-Ph. Inv.	6SC7	6SC7	8S	
6	Power Output	6L6	6L6	7AC	
7	Power Output	6L6	6L6	7AC	
8	Rectifier	6X5GT	6X5GT	6S	
9	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10	30	500	CE-306B	EL-3		UP3050	DY-20-525 M-8-525	Filter
11A	10	450	CE-306A	EL-310	AF222J	UP11145	DY-3X10-450	▲Filter
B	10	450						"
C	10	450						■Filter
12A	10	450	CE-306A	EL-310	AF222J	UP11145	DY-3X10-450	■Decoupling Filter
B	10	450						▲Decoupling Filter
C	10	450						Decoupling Filter
13A	40	25	CE-806A			EDL4415		Cathode Bypass
B	40	25						Cathode Bypass
14	40	25		TA-50	PSR25-50	BR502	M-50-25	Cathode Bypass
15	5.0	110AC				KG2050-1	FF-1	Phono Motor Shunt
16	.5	600		BP506	630-.5	DYR6050	XDMR6-.5	Line Filter
17	.2	200		TC-2	484-.2	DT2P2	ST-4-2	Hash Filter
18	.5	200		TC-5	484-.5	DT2P5	ST-2-5	Hash Filter
19	.5	200		TC-5	484-.5	DT2P5	ST-2-5	Hash Filter
20	.1	600		TC-1	684-.1	DT6P1	ST-6-1	Audio Coupling
21	.1	600		TC-1	684-.1	DT6P1	ST-6-1	Audio Coupling
22	.05	400		TC-15	484-05	DT4S5	ST-4-05	Tone Comp.
23	.05	400		TC-15	484-05	DT4S5	ST-4-05	Audio Coupling
24	.05	400		TC-15	484-05	DT4S5	ST-4-05	Screen Bypass
25	.05	400		TC-15	484-05	DT4S5	ST-4-05	Screen Bypass
26	1000	300		TC-21	1467-001	IW5D1	MW.5-21	Tone Comp.
27	5000	300		TC-25	1467-005	ID5D1	MW.5-25	Audio Coupling
28	5000	300		TC-25	1467-005	ID5D1	MW.5-25	Audio Coupling

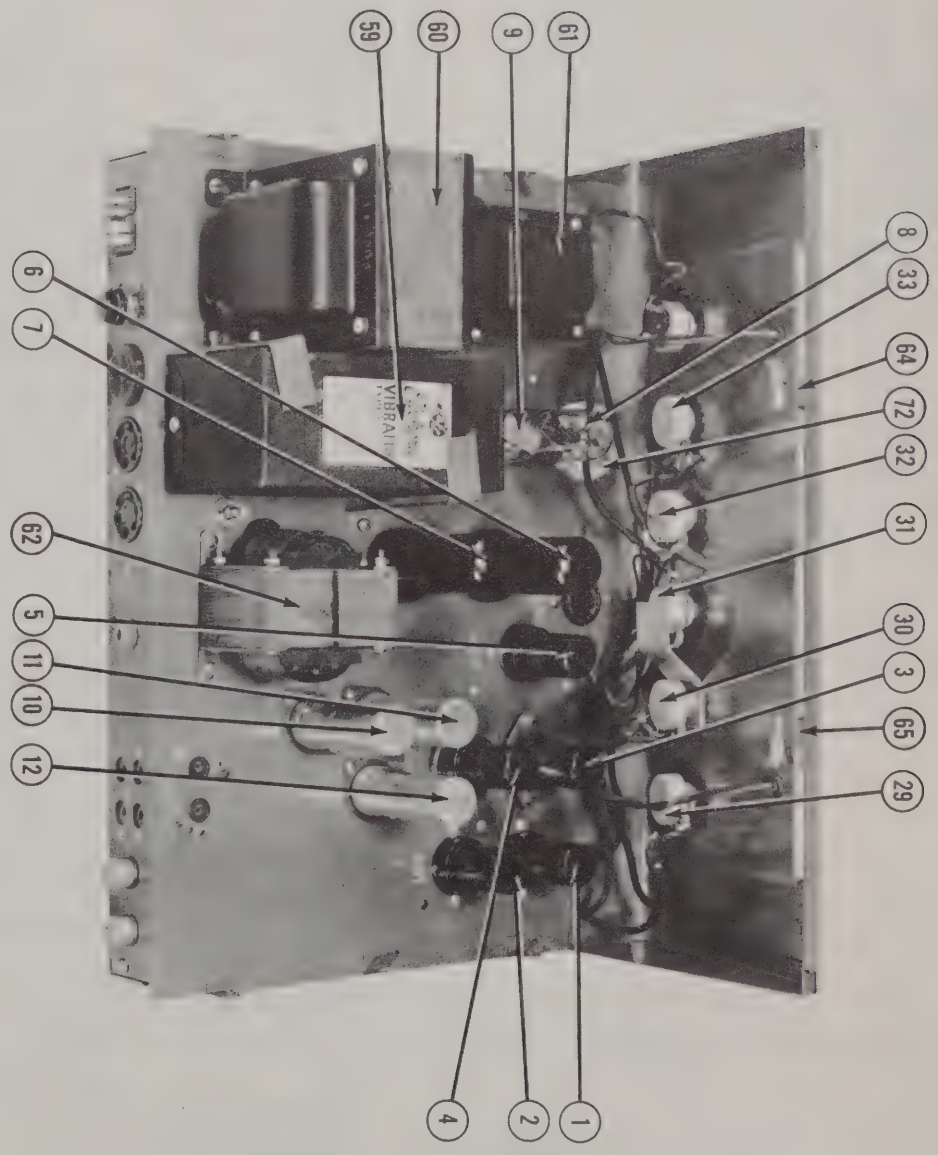
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
29A	500KΩ	½		D13-133	M-60-Z	Mike 1 Control
B	Shaft			A	Not Req.	Attach to 29A per instructions
30A	500KΩ	½		D13-133	M-60-Z	Mike 2 Control
B	Shaft			A	Not Req.	Attach to 30A per instructions
31A	1 Meg.	½		DVE-539X		Phono Control tapped @ 500KΩ
B	Shaft			A		Attach to 31A per instructions
32A	2 Meg.	½				Bass Control
B	Shaft					Attach to 32A per instructions
33A	200KΩ	½		D13-130	M-64-Z	Treble Control
B	Shaft			A	Not Req.	Attach to 33A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	IRC PART No.	IDENTIFICATION CODES
34	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn 1st Mic. Amp. Grid
35	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Grid
36	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Screen Dropping
37	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Screen Dropping
38	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 1st Mic. Amp. Plate Load
39	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd Mic. Amp. Plate Load
40	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st AF Cathode

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

41	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Screen Dropping
42	40KΩ	½		BTS-47K	Yl.-Blk.-Or. 1st AF Plate Load
43	22KΩ	½		BTS-22K	Red-Red-Or. Mic. Amp. Decoupling
44	22KΩ	1		BTA-22K	Red-Red-Or. Bleeder
45	40KΩ	½		BTS-47K	Yl.-Blk.-Or. Decoupling
46	10KΩ	1		BTA-10K	Br.-Blk.-Or. Decoupling
47	330KΩ	½		BTS-330K	Or.-Or.-Yl. Feedback
48	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd AF Grid
49	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd AF Cathode
50	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Load
51	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
52	3900Ω	½		BTS-3900	Or.-White-Red Phase Inverter Grid
53	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Output Grid
54	100KΩ	½		BTS-100K,	Br.-Blk.-Yl. Output Grid
55	200Ω	10		AB-200	Output Cathode
56A	2800Ω			AB-3000	Bleeder
B	13KΩ			AB-12500	Bleeder
C	7KΩ			AB-7000	Bleeder
57	6Ω	20		DG-5	Voltage Dropping
58	47Ω	1		BW-1-47	Yl.-Vi.-Blk. Hash Suppression

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
59	Interrupter	6.3	60∿	JV-0002		

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
60A	117VAC @ 1.2A	780VCT @ .158A	6.3VAC @ 5.2A		LP-0004A			
B	6.0V.DC @ 17.7A	780V.CT @ .158A						

The rating for 60A is operation in AC position. The rating for 60B is operation in battery position. In battery operation, Sec. 2 is the 6 volt primary.

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: KNIGHT PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
61	.03A	110Ω	8.5 Henries	LC-0016	C-2303*	T20C54*	C-3191*	*Drill New Mounting Holes

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
62	7200Ω CT	2Ω 4Ω 6Ω 8Ω 250Ω 500Ω	220Ω CT	.3Ω .35Ω .4Ω .5Ω 12Ω 18Ω	LO-0014A	A-3801*	T22S68*	A-3130*	*Drill New Mounting Holes

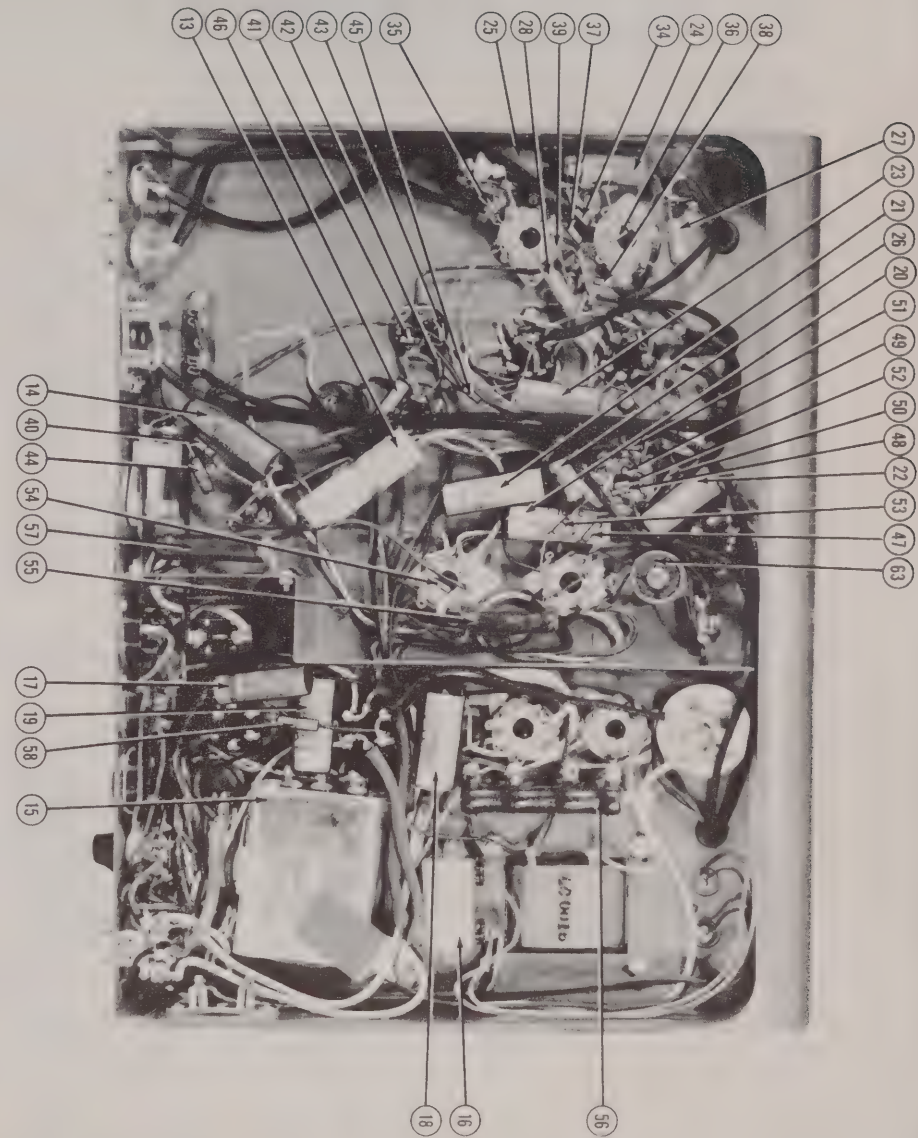
R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: MEISSNER PART No.
63A	RF Fil. Choke		.1Ω	LC-0099	
63B	RF Fil. Choke		.1Ω		

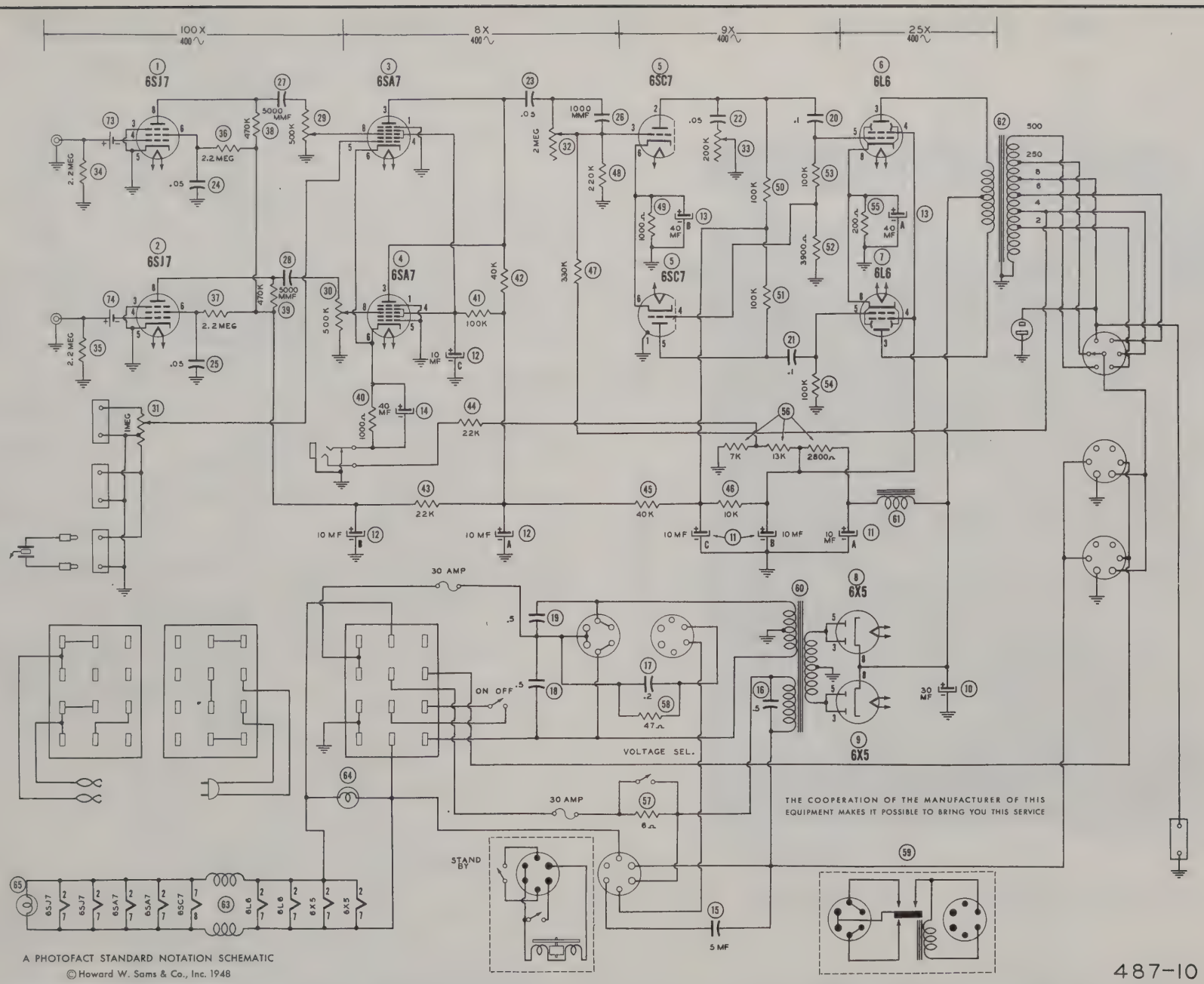
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
64	Bayonet	6-8V	0.4A	White			Type 55
65	Bayonet	6-8V	0.4A	White			Type 55

CHASSIS—BOTTOM VIEW



KNIGHT MODEL 93-156



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TRADE NAME	Magnavox, Chassis CR-197
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	AC Operated Combination Phono-Radio 2 Band Superheterodyne Receiver with Loop Ant.
TUBES (TEN)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6J5 Det.-AVC, 6J5 1st AF Amp., 6U5/6G5 Tuning Eye, 6SN7GT AF-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATING .9 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	525-1630KC — SHORT WAVE 4.95-18.4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed. Pointer should set at last reference mark at low frequency end of dial. If it does not loosen set screw on tuning cap. drum hub and set pointer correctly.

In Step 6 If an audio oscillator is not available turn band switch to BC and tune receiver to a point between two stations on adjacent channels having approximately same power. If A12 is out of adjustment a 10KC whistle will be heard. Adjust A12 until whistle is at a minimum.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	250MMFD	High side to Pin 5 (Osc. Grid) 6SA7. Low side to chassis.	455KC	BC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Set treble control to sharp tune. Adjust A1, A2, A3 & A4 for maximum output.
2	250MMFD	High side to ext. ant. terminal. (Link connected for ant. operation). Low side to chassis.	600KC	"	Tune for maximum output.	"	A5	Rock tuning cap. and adjust for maximum output.
3	250MMFD	"	1400KC	"	1400KC	"	A6,A7, A8	Adjust for maximum output in order given. Repeat Steps 2 & 3 until no further improvement can be made making Step 3 last adjustment.
4	400Ω carbon resistor	"	15MC	SW	15MC	"	A9	Adjust for maximum output. Tune sig. gen. to 15.91MC If signal is not heard retune sig. gen. to 15MC and open A9 until next peak is obtained. Adjust for maximum output and recheck for image.
5	"	"	"	"	Tune for maximum output.	"	A10, A11	Rock tuning cap. and adjust for maximum output.
6		High side to phono jack. Low side to chassis.	10,000∿ (audio generator)			"	A12	Turn treble control to full range adjust A12 for minimum output. If an audio generator is not available see pre-alignment instructions for adjustment of A12. Install receiver in cabinet.
7		Link connected for loop operation. Use radiation loop.	1400KC	BC	Tune for maximum output.	"	A13	Turn treble control to sharp tune. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

PUSHBUTTON ADJUSTMENTS

1. Turn receiver on and allow it to warm up for about 15 minutes. Turn selectivity switch to "sharp tune" position. Loosen all buttons a few turns.
2. Make a list of desired stations ranging from high end of band to low end of band.
3. Manually tune in 1st station and push in manual tuning control so that the station cannot be detuned.
4. Push 1st button on right in completely and tighten firmly.
5. To check accuracy of setting, detune with manual tuning control. Then retune with pushbutton. If setting is off repeat last three steps.
6. To set up the remaining buttons follow the same procedure as outlined above setting up the buttons from right to left.

MAGNAVOX MODEL
151B (Ch. CR-197C)

MAGNAVOX MODEL
151B (Ch. CR-197C) PAGE 1

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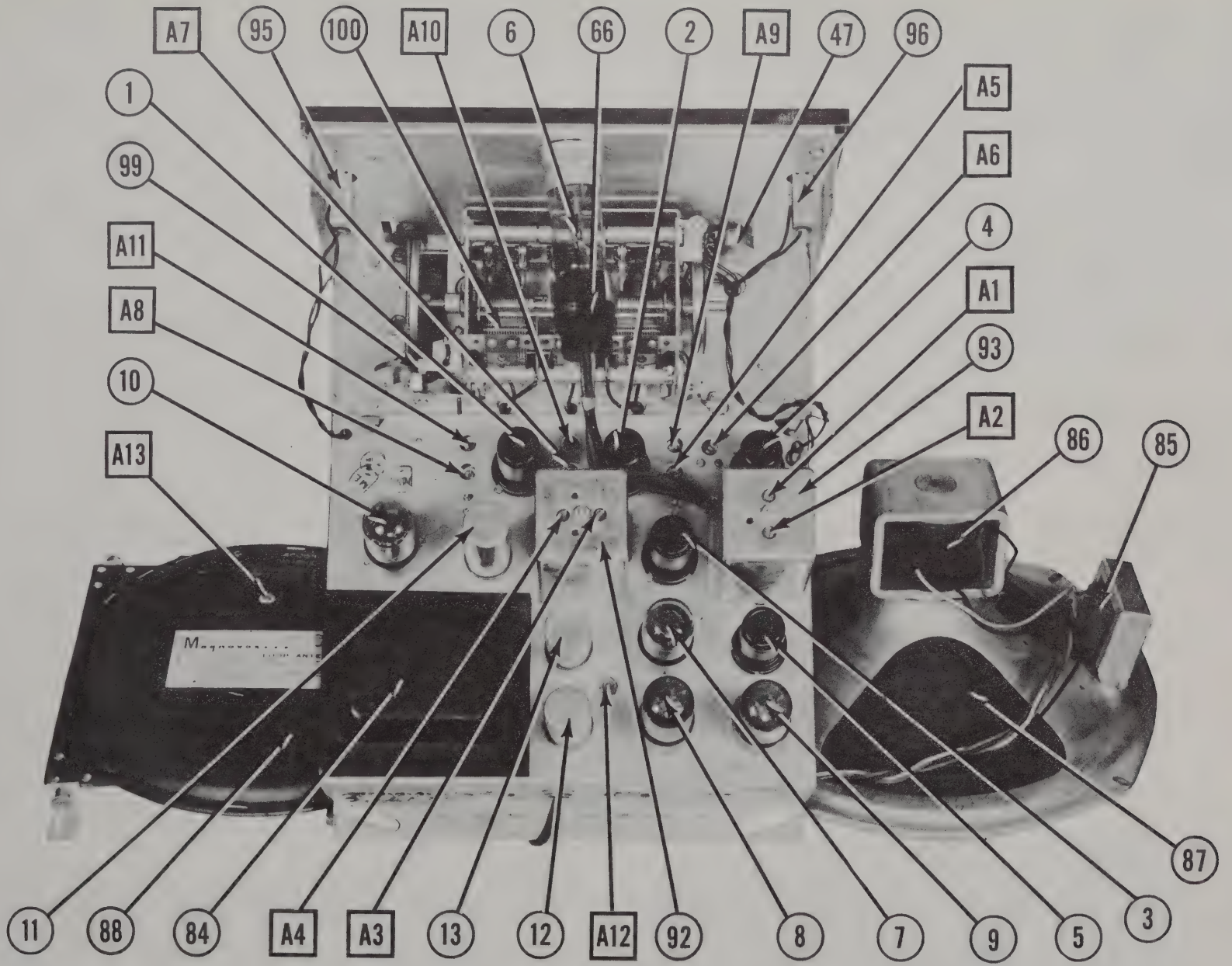
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC	6J5	6J5	6Q	
5	1st AF Amp.	6J5	6J5	6Q	
6	Tuning Eye	6U5/6G5	6U5/6G5	6R	
7	AF-Phase Inv.	6SN7GT	6SN7GT	8BD	
8	Power Output	6V6GT	6V6GT	7AC	
9	" "	6V6GT	6V6GT	7AC	
10	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
11A	30	450	27002302	EL-220	AF44J	UP2245	DY-2x20-450	■ Filter
B	10	450						▲ "
12A	10	450	27002306	EL-202*	AF22J4A*	UP1045C	DY-10-450/25-50	■ AF Plate Decoup. ▲ Output Cathode Bypass
B	20	25						
13A	10	450	27002306	EL-202*	AF22J4A*	UP1045C	DY-10-450/25-50	■ AF Plate Decoupling ▲ AF Cathode Bypass
B	20	25						
14	20	25	27002702	TA-25	PRS25-25	BR202A	M-25-25	AF Cathode Bypass
15	.02	600	25012903	TC-12	684-.02	DT6S2	MPH-6-02	Line Filter
16	.02	600	25012903	TC-12	684-.02	DT6S2	MPH-6-02	" "
17	.02	600	25012903	TC-12	684-.02	DT6S2	MPH-6-02	Phono Isolation
18	.01	600	25015203B	TC-11	684-.01	DT6S1	ST-6-01	Tone Comp.
19	.03	400	25015202S	TC-13	484-.03	DT4S3		Audio Coupling
20	.01	200	25015201B	TC-11	484-.01	DT4S1	ST-4-01	Tone Compensation
21	.1	400	25015202Z	TC-1	484-.1	DT4P1	ST-4-1	Audio Coupling
22	.015	200	25015207O		484-.015	DT4S15		Tone Compensation
23	.005	400	25015203O	TC-25	484-.005	DT6D5	ST-6-005	Audio Coupling
24	.02	400	25015202G	TC-12	484-.02	DT4S2	ST-4-02	Tone Comp.-See Note
25	.1	400	25015202Z	TC-1	484-.1	DT4P1	ST-4-1	RF Bypass Pwr. Supply
26	.01	200	25015201B	TC-11	484-.01	DT4S1	ST-4-01	Audio Coupling
27	.1	200	25015201J	TC-1	484-.1	DT4P1	ST-2-1	Screen Bypass
28	.05	200	25015201S	TC-15	484-.05	DT4S5	ST-4-05	IF Cathode Bypass
29	.05	200	25015201S	TC-15	484-.05	DT4S5	ST-4-05	Conv. Cathode Bypass
30	.05	200	25015201S	TC-15	484-.05	DT4S5	ST-4-05	AVC Filter
31	.05	200	25015201S	TC-15	484-.05	DT4S5	ST-4-05	" "
32	.05	200	25015201S	TC-15	484-.05	DT4S5	ST-4-05	RF Cathode
33	.01	600	25015203B	TC-11	684-.01	DT6S1	ST-6-01	Ant. Isolation
34	1800	300	25016006					Tone Comp.
35	1000	300	25016008	1FM-21	1468-.001	1W5D1	MO.3-21	" "
36	330	500	25015906					" "
37	220	500	25015906					" "
38	100	500	25015908	1FM-31	1468-.0001	5W5T1	MO.5-31	Phono Coupling
39	68	500						Phono Tone Comp.
40	220	500	25015910	1FM-32	1468-.0002	5W5T2	MO.5-32	Diode Filter
41	100	500	25015909	1FM-31	1468-.0001	5W5T1	MO.5-31	" "
42	20		25008803	MS-42		5R5Q2	MOS.5-42	Fixed Trimmer-Cer.
43	490	500	25008503	MS-35	1469-.0005	5R5T5	MOS.5-35	Fixed Pad-Silver
44	50		25008802	MS-45	1469-.00005	5R5Q5	MO.5-45	Osc. Grid Cap.-Cer.
45	4700	300	25016005	1FM-25	1467-.005	1D5D5	MW.5-25	RF Coupling
46	4700	300	25016005	1FM-25	1467-.005	1D5D5	MW.5-25	" "

*Omit one section.
Note - Not used in all models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
47A	1 Meg.	½	22007209	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 47A per instructions
48	1 Meg.	½	22007102			Treble Control & Band Exp. Sw.
49A	150KΩ	½	22007304	D13-128	M-51-Z	Bass Control
B	Shaft		Not Req.	A	Not Req.	Attach to 49A per instructions
C	Switch		" "	41	SW-A	" " " " "

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: MEISSNER PART No.	
88	Loop Ant.		.8Ω			
89A	BC Ant.Coil	24Ω	3.5Ω	36027301		
B	SW " "	.5Ω	.1Ω			
90A	BC RF Coil	24Ω	4Ω	36027401		
B	SW " "	.5Ω	.1Ω			
91A	BC Osc.Coil	.5Ω	4.5Ω	36027501		
B	SW " "		.1Ω			
92	Input IF	7Ω	7Ω‡	36002401		‡Band expander winding has 1Ω res.
93	Output IF	7.5Ω	7.5Ω	36002501		
94	10KC Filter		500Ω	36027801		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA	INSTALLATION NOTES
95	Bayonet	6-8	0.25	Blue			Type 44
96	"	"	"	"			" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
97		QT3-M	QT-M Original Part

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
98	Switch	16012G1	Band-Phono
99	"		Muting
100	3 Gang Var. Cap.	26007101	(10-553 MMF) each section
A5	Trimmer Strip	26002101	BC Osc. Pad.
A9			SW Osc. Adj.
A6	Trimmer	26006703	BC Osc. Adj.
A7	Trimmer Strip	26002101	RC RF Adj.
A10			SW RF Adj.
A8	" "	26002101	BC Ant. Adj.
A11			SW " "
A12	Trimmer	25000801	10KC Adj.
	Dial Glass	15029101	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAGNAVOX PART No.	IRC PART No.	
50	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
51	470Ω	½	230084G11	BTS-470	Yl.-Vi.-Br. RF Cathode
52	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
53	10KΩ	½	230084G19	BTS-10K	Br.-Blk.-Or. BC-RF Coil Shunt
54	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
55	150Ω	2	230084G8	BW-½-150	Br.-Grn.-Br. Converter Cathode
56	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. Oscillator Grid
57	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. Tone Compensation
58	2200Ω	½	230084G15	BTS-2200	Red-Red-Red IF Cathode
59	470Ω	½	230084G11	BTS-470	Yl.-Vi.-Br. IF Cathode
60	15KΩ	2	230084G20	BT-2-15K	Br.-Grn.-Or. Bleeder
61	100Ω	½	230084G7	BW-½-100	Br.-Blk.-Br. Parasitic Suppressor
62	10KΩ	3	24003SG2	AB-10K	Screen Dropping
63	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. Diode RF Filter
64	150KΩ	½	230084G26	BTS-150K	Br.-Grn.-Yl. Diode Load
65	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
66	560KΩ	½	230084G95	BTS-560K	Grn.-Blue-Yl. Tuning Indicator Plate Load
67	4700Ω	½	230084G17	BTS-4700	Yl.-Vi.-Red 1st AF Cathode
68	150KΩ	½	230084G26	BTS-150K	Br.-Grn.-Yl. 1st AF Plate Load
69	10KΩ	½	230084G31	BTS-10K	Br.-Blk.-Or. Tone Compensation-See Note
70	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. 1st AF Plate Decoupling
71	82KΩ	½	230084G85	BTS-82K	Gray-Red-Or. Tone Compensation
72	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. 2nd AF Grid
73	1500Ω	½	230084G14	BTS-1500	Br.-Grn.-Red 2nd AF Cathode
74	100KΩ	1		BTA-100K	Br.-Blk.-Yl. 2nd AF Plate Load
75	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
76	4700Ω	½	230084G17	BTS-4700	Yl.-Vi.-Red Decoupling
77	15KΩ	½	230084G187	BTS-15K	Br.-Grn.-Or. Phase Inverter Grid
78	220KΩ	½	230084G215	BTS-220K	Red-Red-Yl. Output Grid
79	270KΩ	½	230084G91	BTS-270K	Red-Vi.-Yl. " "
80	220Ω	2	230084G54	BW-2-220	Red-Red-Br. Output Cathode
81	1 Meg.	½	230084G98	BTS-1 Meg.	Br.-Blk.-Grn. Tone Compensation
82	15KΩ	1	230085G20	BTA-15K	Br.-Grn.-Or. " "
83	680KΩ	½		BTS-680K	Blue-Gray-Yl. 1st AF Grid-See Note

Note-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
84*	117V AC @ .9A	740V CT @ .112A	5.1V AC @ 2.0A	6.3V CT @ 4.0A	300034G1	P-8165§	T22R07	P-2953

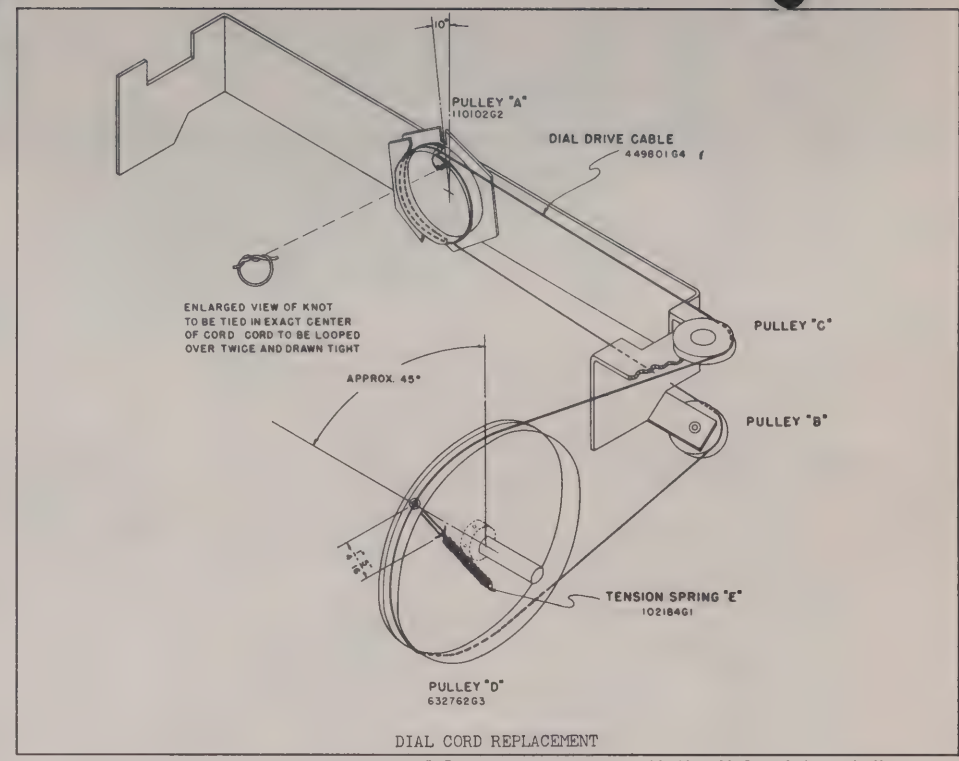
§Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAGNAVOX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
85	7500Ω CT	3.6Ω	400Ω CT	.3Ω	Part of 582806	A-3824	T22S58	A-2904†	†Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD RES.	VC IMP.	MAGNAVOX PART No.	JENSEN PART No.	QUAM PART No.	
86	1000Ω	3.6Ω	582806		12E10#	#Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
87	11½"	1"				



DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in figure above until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical-see figure above. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

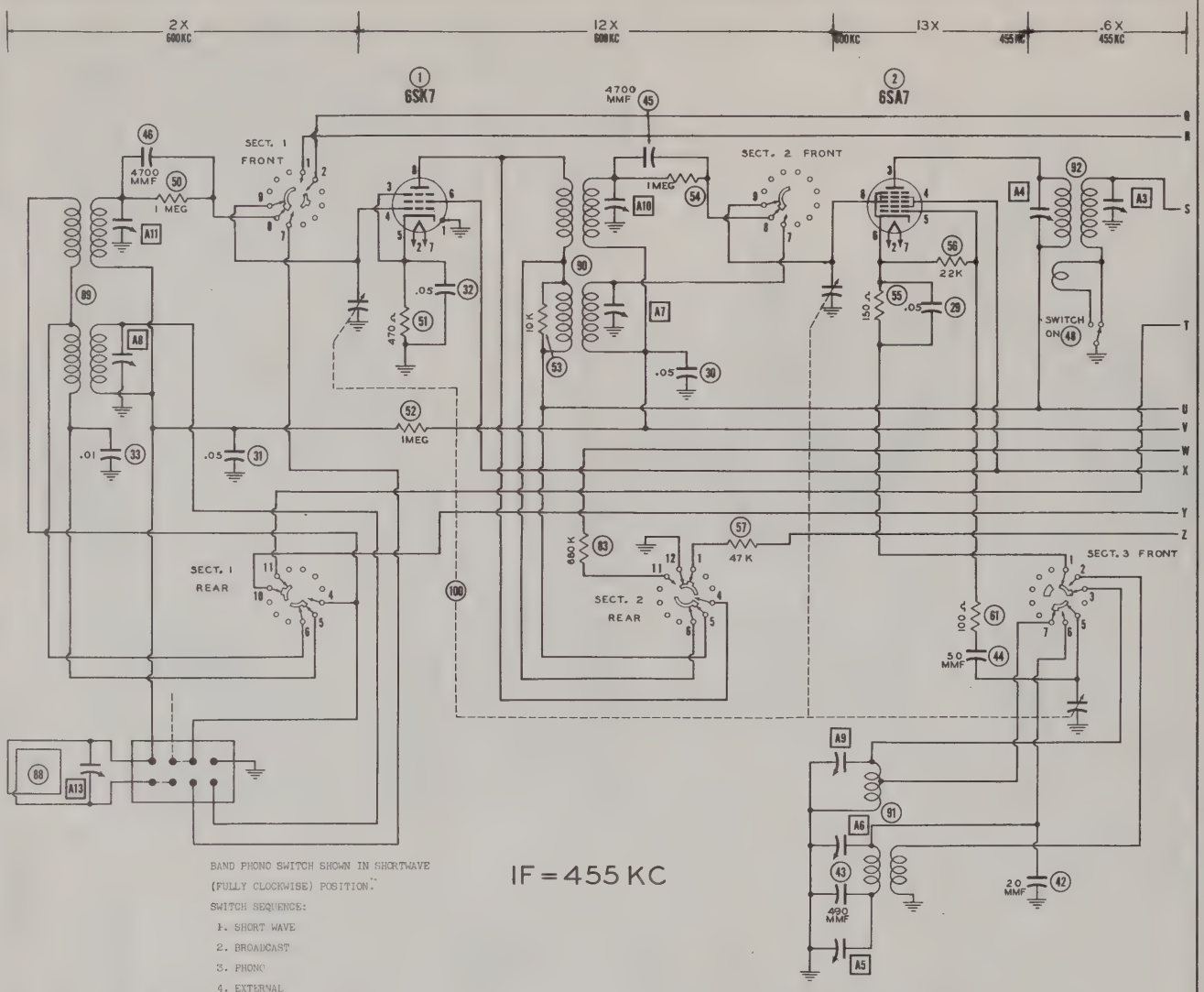
To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D". If this hole is not approximately 45 degrees back from vertical as shown on figure above, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on figure above. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn then over the lower pulley "B", around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C", and over the top of pulley "D". Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow 1/4" to 5/16" of cable between the spring and the inside rim of pulley "D". Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pully "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

DATE 3/48-#467-11 SET #37-FOLDER #11



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	3.15VAC	3.8VAC	0V.	3.8VAC	92VDC	3.15VAC	260VDC
2	6SA7	0V.	3.15VAC	260VDC	92VDC	-5VDC§	1.3VDC	3.15VAC	-.45VDC
3	6SK7	0V.	3.15VAC	8VDC	0V.	8VDC	92VDC	3.15VAC	260VDC
4	6J5	0V.	3.15VAC	-.4VDC	0V.	-.4VDC	0V.	3.15VAC	0V.
5	6J5	0V.	3.15VAC	105VDC	0V.	0V.	237VDC	3.15VAC	4.7VDC
6	6U5	3.15VAC	28VDC	-.45VDC	260VDC	0V.	3.15VAC	-	-
7	6SN7GT	0V.	97VDC	4VDC	0V.	100VDC	4VDC	3.15VAC	3.15VAC
8	6V6GT	0V.	3.15VAC	250VDC	260VDC	0V.	249VDC	3.15VAC	15VDC
9	6V6GT	0V.	3.15VAC	250VDC	260VDC	0V.	250VDC	3.15VAC	15VDC
10	5Y3GT	0V.	380VDC	0V.	370VAC	0V.	370VAC	0V.	380VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

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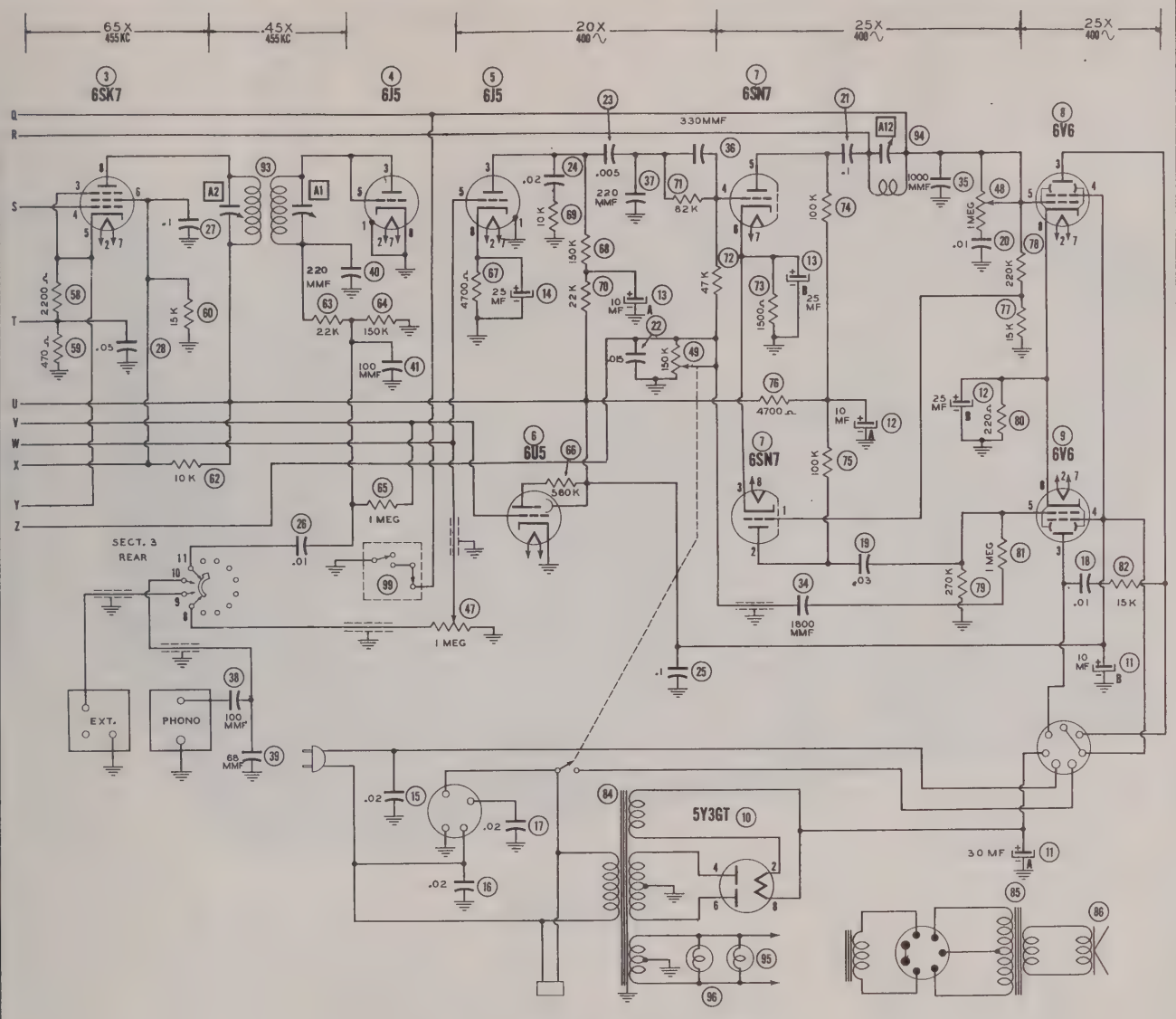
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	.05Ω	470Ω	2.5 Meg.	470Ω	15KΩ	.05Ω	25KΩ
2	6SA7	0Ω	.05Ω	25KΩ	1.5KΩ	22KΩ	135Ω	.05Ω	1.2 Meg.
3	6SK7	0Ω	.05Ω	2.6KΩ	7Ω	2.6KΩ	15KΩ	.05Ω	25KΩ
4	6J5	0Ω	.05Ω	170KΩ	INF.	170KΩ	INF.	.05Ω	0Ω
5	6J5	0Ω	.05Ω	195KΩ	1.2 Meg.	1 Meg.	40KΩ	.05Ω	4.7KΩ
6	6U5	.05Ω	565KΩ	1 Meg.	25KΩ	0Ω	.05Ω	-	-
7	6SN7GT	15KΩ	125KΩ	1.5KΩ	200KΩ	125KΩ	1.5KΩ	.05Ω	.05Ω
8	6V6GT	0Ω	.05Ω	25KΩ	25KΩ	235KΩ	25KΩ	.05Ω	220Ω
9	6V6GT	0Ω	.05Ω	25KΩ	25KΩ	270KΩ	35KΩ	.05Ω	220Ω
10	5Y3GT	INF.	25KΩ	INF.	125Ω	INF.	115Ω	INF.	25KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

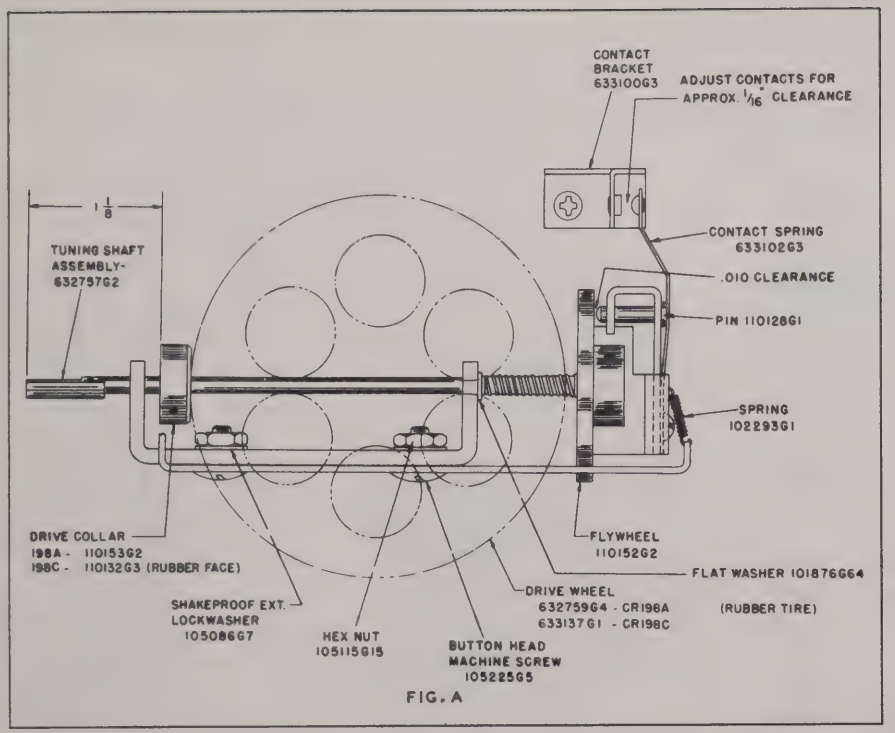


FIG. A

CONDENSER GANG DRIVE ADJUSTMENTS

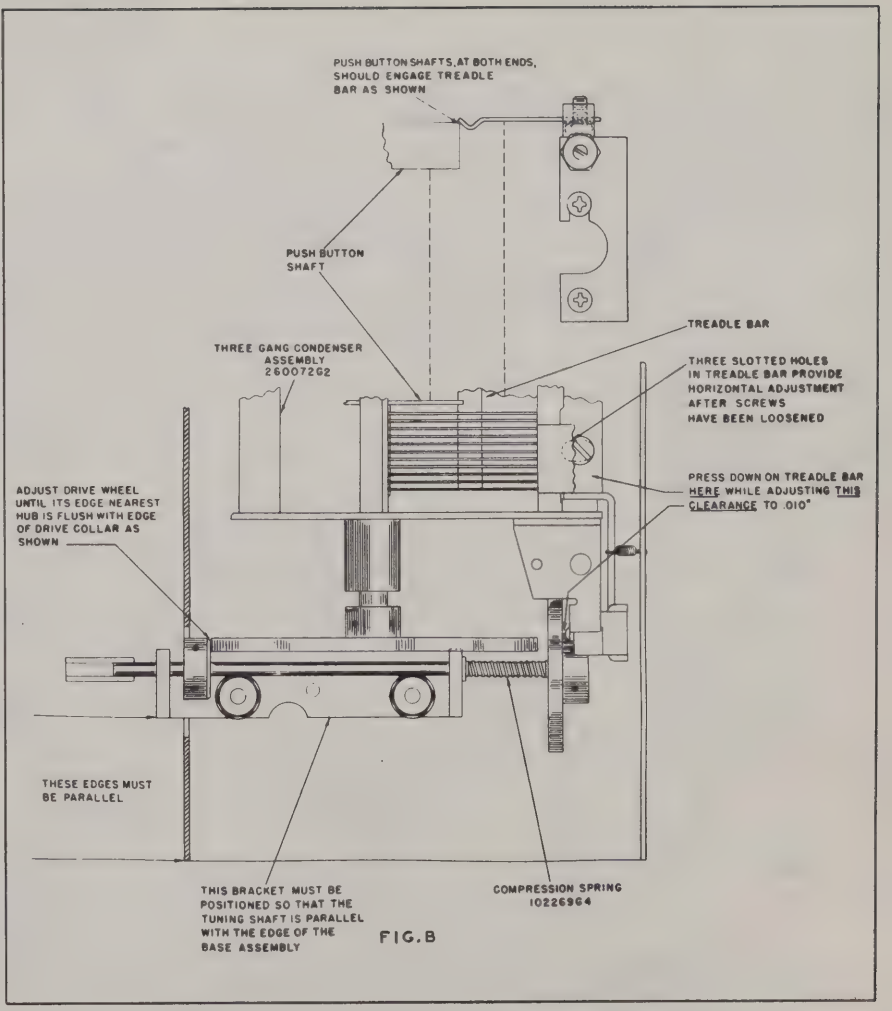
Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustment shown on figures A and B are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on figure B. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1-1/8 inches as specified on figure A. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge--when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on figure B. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.


PUSH BUTTON SHAFTS, AT BOTH ENDS, SHOULD ENGAGE TREADLE BAR AS SHOWN
PUSH BUTTON SHAFT
TREADLE BAR
THREE GANG CONDENSER ASSEMBLY 26007202
THREE SLOTTED HOLES IN TREADLE BAR PROVIDE HORIZONTAL ADJUSTMENT AFTER SCREWS HAVE BEEN LOOSENED
PRESS DOWN ON TREADLE BAR HERE WHILE ADJUSTING THIS CLEARANCE TO .010"
ADJUST DRIVE WHEEL UNTIL ITS EDGE NEAREST HUB IS FLUSH WITH EDGE OF DRIVE COLLAR AS SHOWN
THESE EDGES MUST BE PARALLEL
THIS BRACKET MUST BE POSITIONED SO THAT THE TUNING SHAFT IS PARALLEL WITH THE EDGE OF THE BASE ASSEMBLY
COMPRESSION SPRING 102269G4
FIG. B

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this Photofact Folder.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on figure B, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

MEISSNER MODEL 8C

MEISSNER MODEL 8C

MEISSNER MODEL 8C

TRADE NAME	Meissner, Model 8C
MANUFACTURER	Meissner Mfg. Co., Div. of Maguire Industries Inc., Mt. Carmel, Ill.
TYPE SET	AC Operated FM Tuner with Self-Contained Power Supply
TUBES (EIGHT)	Types, 6AG5 1st Mixer, 6AG5 2nd Mixer, 6C4 Osc., 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Det., 6C4 AF Amp., 6X5GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.43 Amp. @ 117 Volts AC
TUNING RANGE - FREQ. MOD.	88-108MC

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MEISSNER PART No.	STANDARD REPLACEMENT		
1	1st Mixer	6AG5	6AG5	7BD	
2	2nd Mixer	6AG5	6AG5	7BD	
3	Oscillator	6C4	6C4	6BG	
4	1st IF Amp.	6BA6	6BA6	7BK	
5	2nd IF Amp.	6BA6	6BA6	7BK	
6	Ratio Det.	6AL5	6AL5	6BT	
7	AF Amp.	6C4	6C4	6BG	
8	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MEISSNER PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
9A	20	450		EL-220	AF44J	UP2245	DY-2x20-450	▲ Filter
B	20	450						■ "
10	10	450		UT-12	PRS450-10	BR1045	M-10-450	"
11	25	25		TA-25	PRS25-25	BR252A	M-25-25	Cathode Bypass
12	10	50		TA-510	PRS50-10	BR105	M-10-50	Stabilizing Cap.
13	.05	600		TC-15	684-05	DT6S5	MPH-6-05	Line Filter
14	.05	600		TC-15	684-05	DT6S5	MPH-6-05	" "
15	.05	400		TC-15	484-05	DT4S5	ST-4-05	Audio Coupling
16	.002	600		TC-22	684-002	DT6D2	ST-6-002	De-emphasis
17	.05	400		TC-15	484-05	DT2S5	ST-4-05	Audio Coupling
18	.01	400		TC-11	484-01	DT4S1	ST-4-01	2nd IF Decoupling
19	.01	400		TC-11	484-01	DT4S1	ST-4-01	1st IF Decoupling
20	.01	400		TC-11	484-01	DT4S1	ST-4-01	AVC Filter
21	.01	400		TC-11	484-01	DT4S1	ST-4-01	2nd Mixer Plate Decoup.
22	.01	400		TC-11	484-01	DT4S1	ST-4-01	2nd Mixer Screen Bypass
23	.01	400		TC-11	484-01	DT4S1	ST-4-01	2nd Mixer Cathode Bypass
24A								Diode Load Cap.
B								" " "
25	1	500						Osc. Coupling-Cer.
26	25	500		MS-425	1468-000025	5W5Q25	MO.5-425	Osc. Grid Cap.-Cer.
27	250	500		1FM-325	1468-00025	5W5T25	MO.5-325	Osc. Plate Bypass
28	15	500		MS-415				Osc. Coupling-Cer.
29	1000	300		1FM-21	1466-001	1W5D1	MO.3-21	1st Mixer Plate Decoup.
30	470	500		1FM-35	1468-0005	5W5T5	MO.5-35	Var. IF Coupling
31	1000	300		1FM-21	1466-001	1W5D1	MO.3-21	Fixed Padder
32	1000	300		1FM-21	1466-001	1W5D1	MO.3-21	1st Mixer Screen Bypass

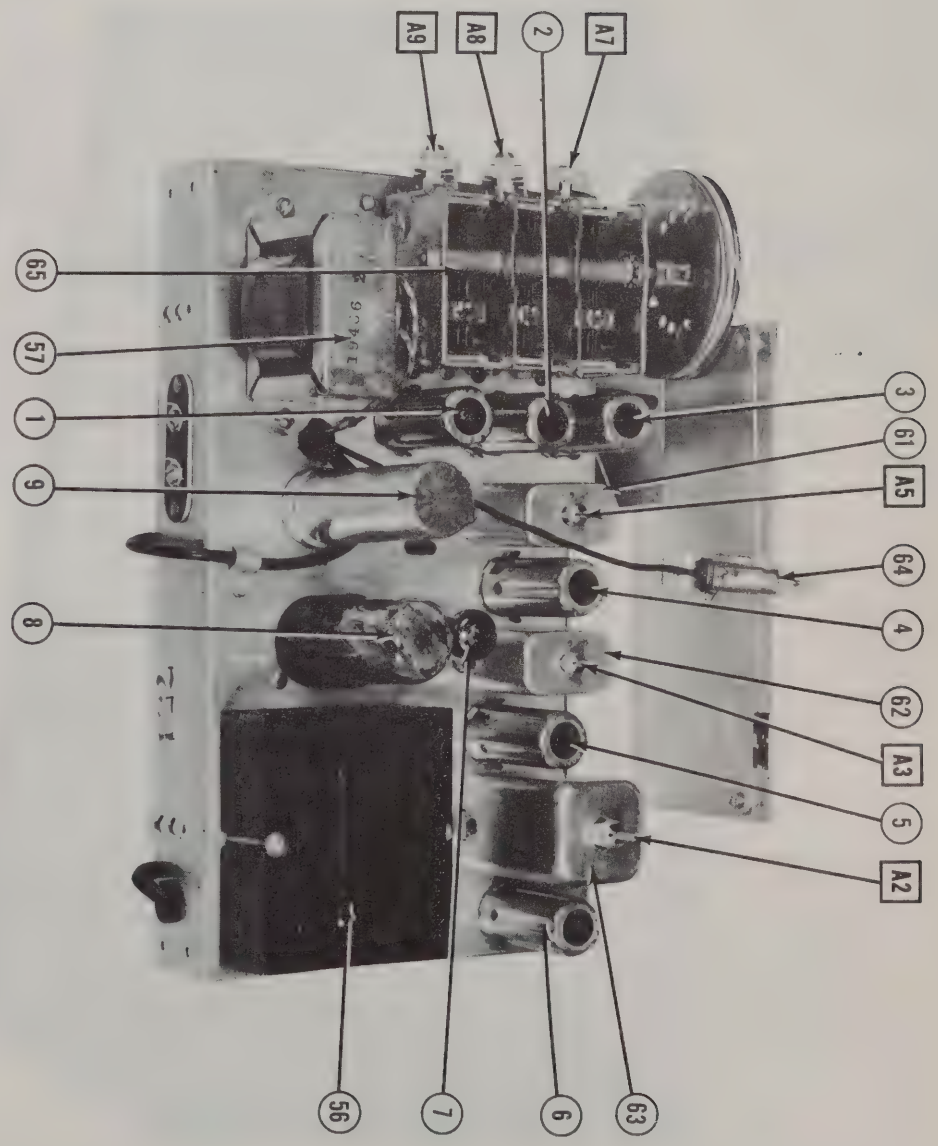
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MEISSNER PART No.	IRC PART No.	CLAROSTAT PART No.	
33A	500KΩ	½	29424	D13-133	AM-60-2	Volume Control
B	Shaft		Not Req.	E	KS5-3	Attach to 33A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MEISSNER PART No.	IRC PART No.	
34	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st Mixer Cathode
35	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 1st Mixer Screen Dropping
36	4700Ω	½		BTS-4700	Yl.-Vi.-Red 1st Mixer Plate Decoupling
37	33KΩ	½		BTS-33K	Or.-Or.-Or. Oscillator Grid
38	6800Ω	1		BTA-6800	Blue-Gray-Red Oscillator Plate Load
39	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd Mixer Grid
40	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd Mixer Cathode
41	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 2nd Mixer Screen Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MEISSNER PART No.	IRC PART No.	
42	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd Mixer Plate Decoupling
43	1800Ω	2		BT-2-1800	Br.-Gray-Red Decoupling
44	68Ω	½			Blue-Gray-Blk. 1st IF Cathode
45	6800Ω	2		BT-2-6800	Blue-Gray-Red 1st IF Decoupling
46	68Ω	½			Blue-Gray-Blk. 2nd IF Cathode
47	6800Ω	2		BT-2-6800	Blue-Gray-Red 2nd IF Decoupling
48	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
49	220Ω	½			Red-Red-Br. Balancing Network
50	6800Ω	½		BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
51	6800Ω	½		BTS-6800	Blue-Gray-Red " " " "
52	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
53	1000Ω	½		BTS-1000	Br.-Blk.-Red AF Cathode
54	27KΩ	1		BTA-27K	Red-Vi.-Or. AF Plate Load
55	10KΩ	½		BTS-10K	Br.-Blk.-Or. AF Plate Decoupling

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MEISSNER PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
56	117V AC @ .43A	500V CT @ .053A	6.3V AC @ 3.0A		19465	P-6120*	T22R04*	P-2552*

*Add series resistor to reduce plate voltage and drill new mounting holes.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	MEISSNER PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
57	.053	400Ω	20 Henries	19466	C-1708	T20053	C-2987	

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MEISSNER PART No.	MEISSNER PART No.	
58	Ant. Coil	0Ω	0Ω	04833		
59	Var. IF Coil		0Ω	04885		
60	Osc. Coil		0Ω	04884		
61	1st IF	.8Ω	.8Ω	05452		
62	2nd IF	.8Ω	.8Ω	05452		
63	Ratio Det.	.6Ω	.2Ω	05453		

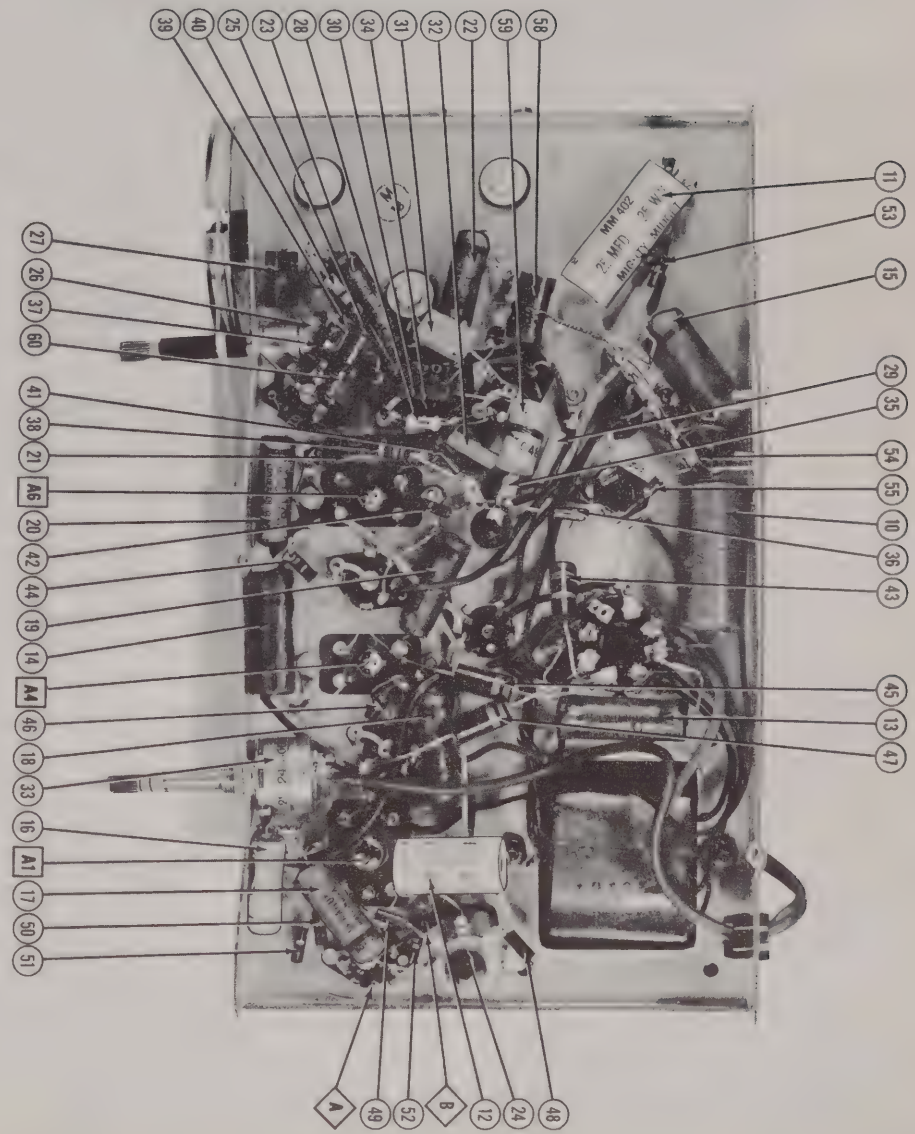
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MEISSNER PART No.		
64	Bayonet	6-8	0.25	Blue			Type 44

MISCELLANEOUS

ITEM No.	PART NAME	MEISSNER PART No.	NOTES
65	3 Gang Var. Cap.		

CHASSIS—BOTTOM VIEW



ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to first reference mark at left end of dial backplate.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 1 (grid) 6BA6 2nd IF Tube. Low side to chassis.	10.7MC (unmodulated)	Tuning cap. fully open.	DC probe to Point (A) Common to chassis.	A1	Adjust for maximum deflection.
2	.05 MFD.	"	"	"	DC probe to Point (B) Common to chassis.	A2	Adjust for zero deflection. Repeat Steps 1 & 2 until no further improvement can be made.
3	DIRECT	Across dipole terminals.	"	"	DC probe to Point (A) Common to chassis.	A3,A4, A5,A6.	Attenuate sig. gen. output to obtain a maximum meter reading of 5 volts. Adjust for maximum deflection. Continue with RF alignment Step 4.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

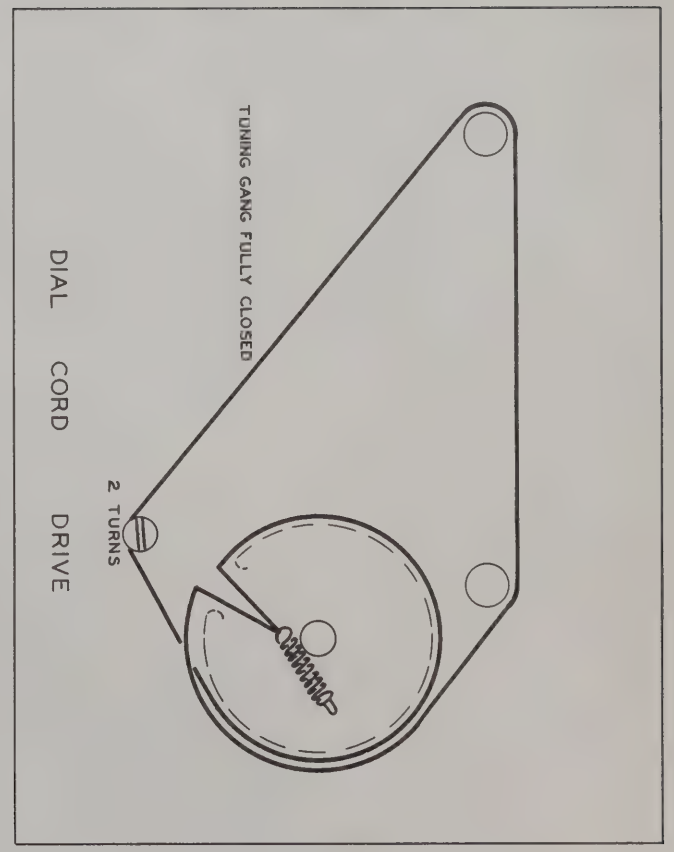
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.05 MFD	High side to Pin 1 (grid) 6AG5 Mixer Tube (2). Low side to chassis.	10.7MC (freq. mod.)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A1,A3, A4,A5, A6	Remove 10 MFD cap. from Point (A). Adjust A1, A3, A4, A5 and A6 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
2	.05 MFD	"	"	"	Vertical input to Point (A). Ground to chassis.	A2	Reconnect 10 MFD cap. to Point A. Adjust A2 for maximum straightness of crossover lines with crossover occurring at center of pattern. Continue with RF alignment Step 4.

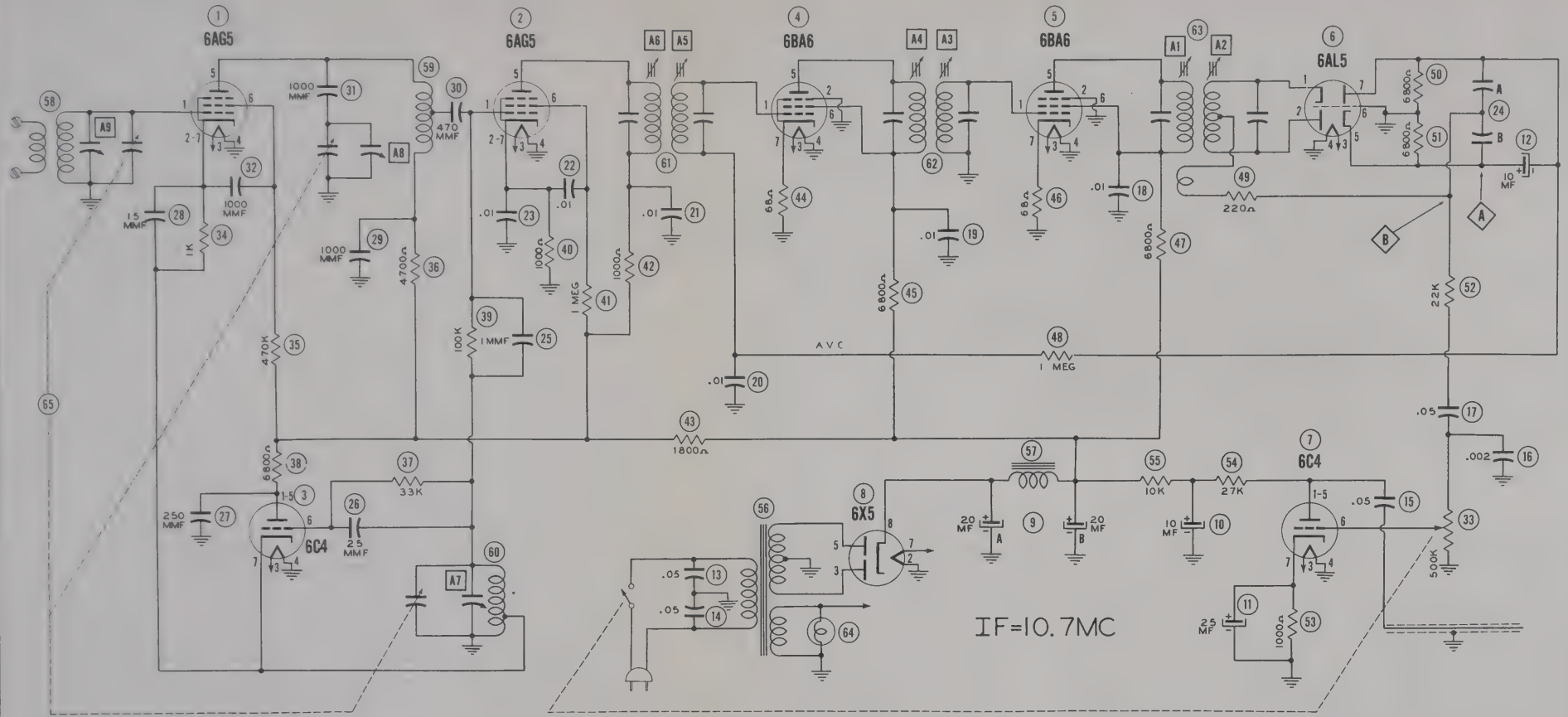
RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	300Ω carbon res.	Across dipole terminals.	108MC (unmodulated)	1st reference mark at right end of dial backplate.	DC probe to Point (A). Common to chassis	A7	Adjust for maximum deflection.
5	"	"	"	Tune for maximum output.	"	A8,A9	Rock tuning cap. and adjust for maximum output. Repeat Steps 4 & 5 until no further improvement can be made.

FIG. 1

FIG. 2





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5	0V.	1.3VDC	6.3VAC	0V.	260VDC	70VDC	1.8VDC	-
2	6AG5	0V.	1.2VDC	6.3VAC	0V.	270VAC	50VDC	1.2VDC	-
3	6C4	190VDC	0V.	6.3VAC	0V.	190VDC	-10.5VDC§	0V.	-
4	6BA6	-.05VDC	0V.	6.3VAC	0V.	92VDC	92VDC	1VDC	-
5	6BA6	0V.	0V.	6.3VAC	0V.	92VDC	92VDC	1VDC	-
6	6AL5	0V.	0V.	6.3VAC	0V.	.3VDC	0V.	-3VDC	-
7	6C4	190VDC	0V.	6.3VAC	0V.	120VDC	0V.	3.6VDC	-
8	5X5GT	0V.	0V.	6.3VAC	0V.	250VAC	210VDC	6.3VAC	290VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5	0Ω	1KΩ	.1Ω	0Ω	95KΩ	560KΩ	1kΩ	-
2	6AG5	100KΩ	1KΩ	.1Ω	0Ω	90KΩ	1 Meg.	1KΩ	-
3	6C4	100KΩ	INF.	.1Ω	0Ω	100KΩ	33kΩ	0Ω	-
4	6BA6	1 Meg.	0Ω	.1Ω	0Ω	98KΩ	98kΩ	68Ω	-
5	6BA6	.8Ω	0Ω	.1Ω	0Ω	98KΩ	94KΩ	68Ω	-
6	6AL5	INF.	INF.	.1Ω	0Ω	608KΩ	INF.	6.8KΩ	-
7	6C4	127KΩ	INF.	.1Ω	0Ω	127KΩ	500KΩ	900Ω	-
8	5X5GT	INF.	0Ω	140Ω	INF.	150Ω	90KΩ	.1Ω	90KΩ

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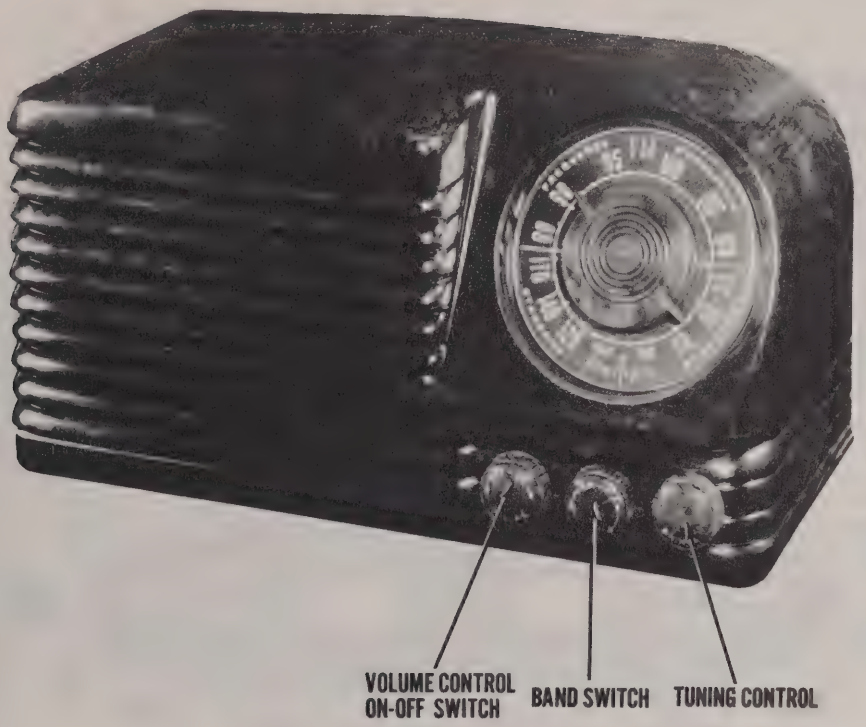
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

487-12

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

OLYMPIC MODEL
7-537



OLYMPIC MODEL
7-537

OLYMPIC MODEL 7-537

TRADE NAME	Olympic, Model 7-537
MANUFACTURER	Olympic Radio & Tele. Corp., 3101-19 36th Ave., Long Island City, N.Y.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12AT7 FM Converter, 12SA7GT AM Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1730KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	1400KC	"	1400KC	"	A5	Adjust for maximum output.
3	200MMFD	"	"	"	Tune for max-imum output.	"	A6	" " " "

FM ALIGNMENT

4		Place signal gen-erator output lead near re-ceiver. (No direct connection)	21.75MC (400~ AM)	FM (clock-wise)	Tuning cap. fully open.	"	A7	" " " "
5		"	108MC (400~ AM)	"	108MC	"	A8	" " " "
6		"	105MC (400~ AM)	"	Tune for max-imum output.	"	A9	Rock tuning cap. and ad-just for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 3/48-#487-13 SET #37-FOLDER #13

PARTS LIST AND DESCRIPTIONS

OLYMPIC MODEL 7-537

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM Converter	12AT7	12AT7		
2	AM Converter	12SA7GT	12SA7GT	8AD	
3	IF Amp.	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

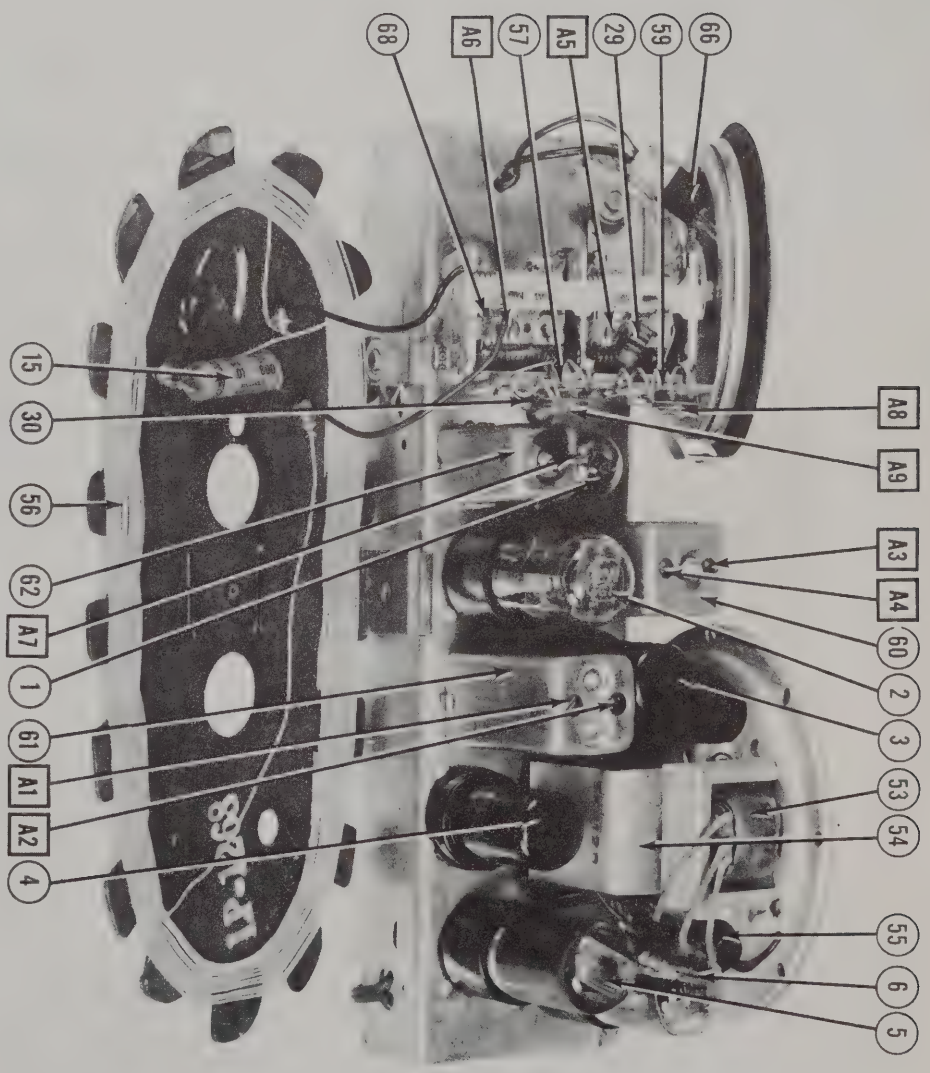
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	CO-111	TA-440	PRSA50502	EDL5315C	DSB-305	Filter - Red
B	40	150						" - Red
C	50	25		TA-50				Cathode Bypass-Yl.
8	10	150		UT-121	PRS150-12	BR1215	M-10-150	Filter
9	10	25	CO-1133	TA-10	PRS25-10	BR102A	M-10-25	Stabilizing Cap.
10	.1	200		TC-1	484-.1	DT2S1	ST-2-1	RF Bypass Pwr. Supply
11	.005	600		TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
12	.01	600		TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
13	.01	600		TC-11	684-01	DT6S1	ST-6-01	" "
14	.05	200		TC-15	484-05	DT2S5	ST-4-05	AVC Filter
15	.01	600		TC-11	684-01	DT6S1	ST-6-01	Ext. Ant. Coupling
16	.02	600		TC-12	684-02	DT6S2	ST-6-02	Audio Coupling
17	.05	400		TC-15	484-05	DT4S5	ST-4-05	Line Filter
18	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
19	10	500		MS-41	1469-00001	5R5.1	MOS.5-41	Fixed Trimmer-See Note-Cor
20	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling "
21	1000	300		1FM-21	1468-0001	1W5D1	MO.3-21	De-emphasis "
22	2500	300		1FM-23	1467-0025	1W5D25	MW.5-225	Quench Network "
23	5000	300		1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass "
24	30	500		MS-43		5R5Q3	MO.5-43	Regenerative Feedback "
25	30	500		MS-43		5R5Q3	MO.5-43	" " "
26	500	500		1FM-35	1468-0005	5W5T5	MO.5-35	RF Bypass "
27	500	500		1FM-35	1468-0005	5W5T5	MO.5-35	Osc. Feedback "
28	20	500		MS-42		5R5Q2	MOS.5-42	Osc. Grid Cap. "
29	50	500		MS-45	1469-00005	5R5Q5	MOS.5-45	Fixed Padder "
30	2.2	500						Osc. Coupling "
31	500	500		1FM-35	1468-0005	5W5T5	MO.5-35	RF Coupling "
32	2.2	500						Line Ant. Coupling "
33	500	500		1FM-35	1468-0005	5W5T5	MO.5-35	Rectifier Bypass "

Note-Not used in some models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
34A	500KΩ	½	PT-102	D13-133	M-60-2	Volume Control
B	Shaft		Not Req.	E	Not Req.	Attach to 33A per instructions
C	Switch		" "	41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	OLYMPIC PART No.	IRC PART No.	
35	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Converter Grid
36	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
37	22KΩ	½		BTS-22K	Red-Red-Or. FM Oscillator Grid
38	100Ω	½		BW-½-100	Br.-Blk.-Br. FM Oscillator Decoupling
39	15KΩ	½		BTS-15K	Br.-Grn.-Or. FM IF Transformer Shunt
40	2200Ω	½		BTS-2200	Red-Red-Red Decoupling
41	1500Ω	½		BTS-1500	Br.-Grn.-Red Quench Network
42	22KΩ	½		BTS-22K	Red-Red-Or. Converter Cathode
43	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis
44	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
45	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
46	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
47	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
48	150Ω	1		BW-1-150	Br.-Grn.-Br. Output Cathode
49	1000Ω	2		BT-2-1000	Br.-Blk.-Red Filter
50	220Ω	1		BW-1-220	Red-Red-Br. Pilot Light Shunt
51	75Ω	2		BW-2-68	Vi.-Grn.-Blk. Line Dropping
52	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Voltage Dropping

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OLYMPIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
53	2000Ω	3.3Ω	160Ω tapped @ 6Ω	.4Ω	Part of SK-1128	A-3876*		A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

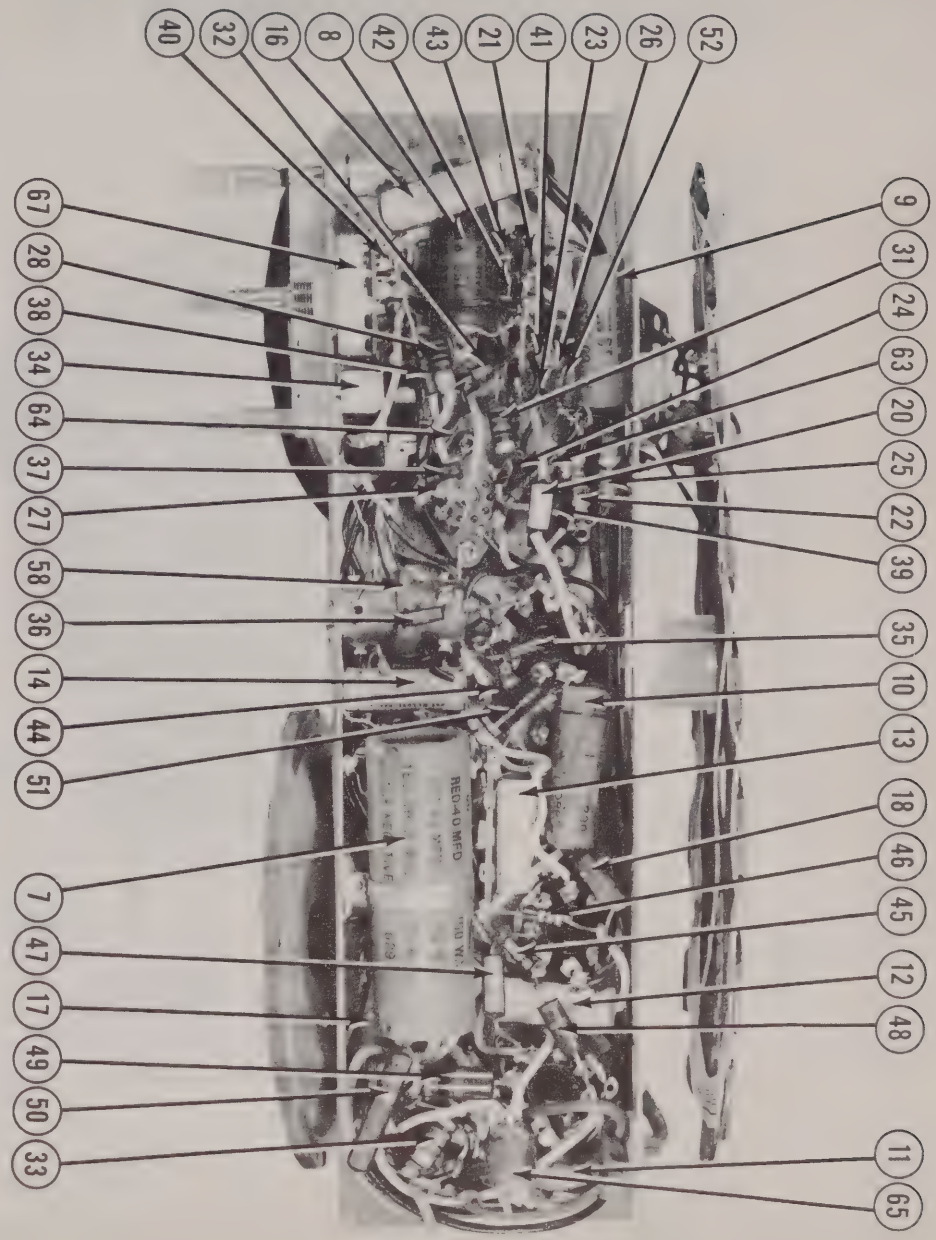
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			OLYMPIC PART No.	JENSEN PART No.	QUAM PART No.	
54	FIELD PM	VC IMP. 3.3Ω	SK-1128	ST-105† Mod. P5-X	5A07†	†Drill and tap magnet frame.
55	CONE DIA. 4-5/8"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.	
56	Loop Ant.	.1Ω	1Ω	LP1268		
57	RF Coil FM		0Ω			
58	AM Osc.Coil	.3Ω	5.5Ω		14-1040‡	‡Add 50MMFD from osc. grid to high side tuning cap.
59	FM " "		0Ω			
60	Input IF	20.5Ω	20.5Ω	TR-707	16-6666	
61	Output IF	18.5Ω		TR-708	16-6670	
62	FM IF	.4Ω	2Ω			
63	RF Choke		1.4Ω			
64	" "		1.4Ω			
65A	Line Choke		.1Ω			
B	" "		.1Ω			

CHASSIS—BOTTOM VIEW



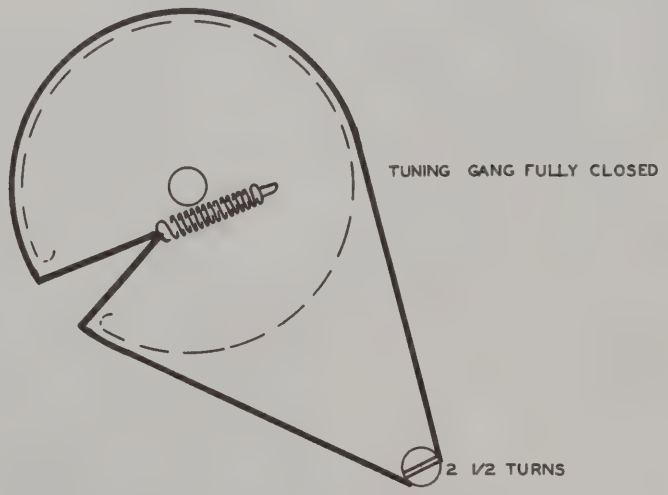
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

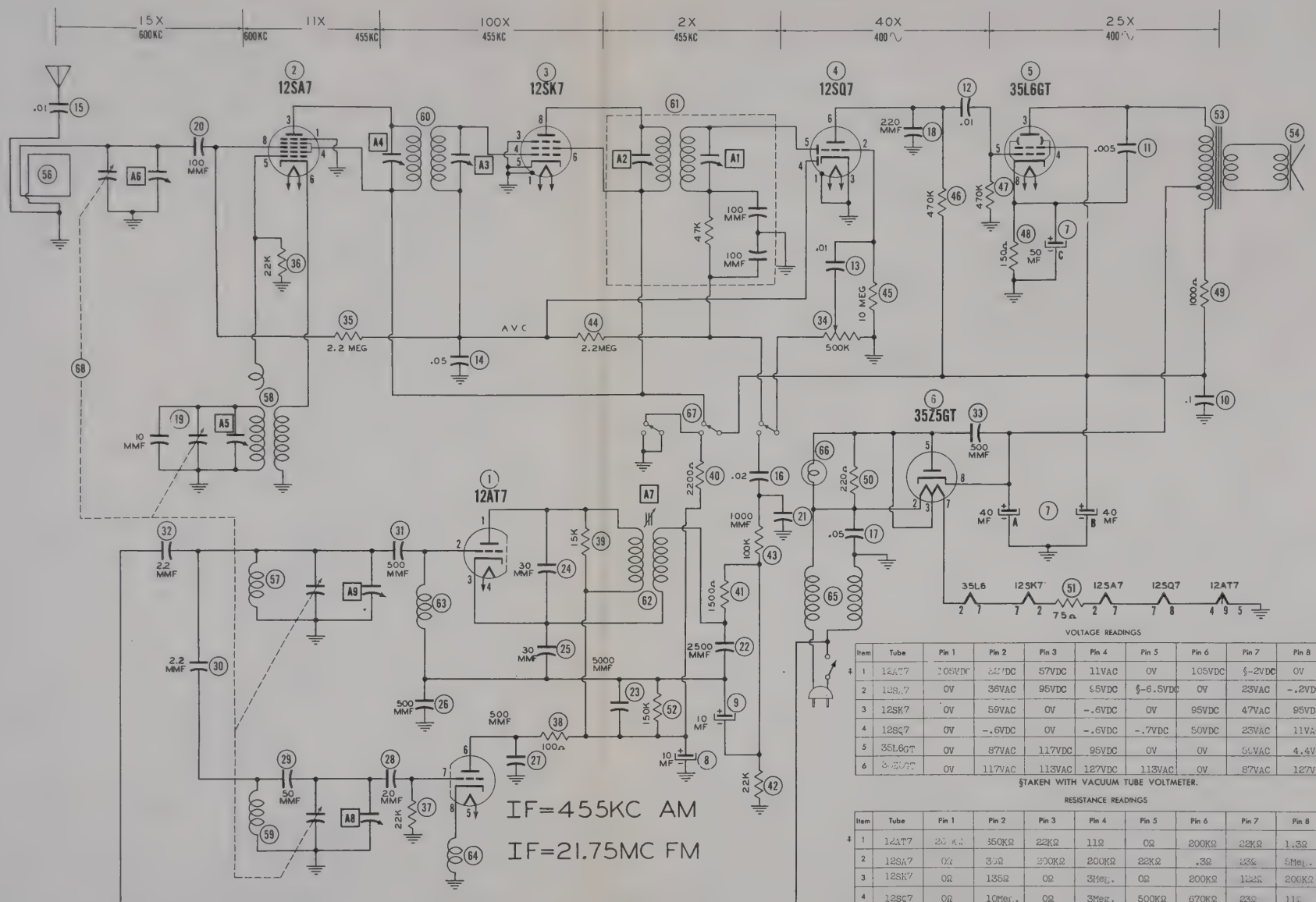
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					OLYMPIC PART No.		
66	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
67	Switch		Band
68	2 Gang Var. Cap.	CV-1141	AM (24-526MMF, 34-206MMF)



DIAL CORD DRIVE



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
‡ 1	12AT7	105VDC	85VDC	57VDC	11VAC	0V	105VDC	§-2VDC	0V	5.3VAC
2	12SA7	0V	36VAC	95VDC	55VDC	§-6.5VDC	0V	23VAC	-.2VDC	--
3	12SK7	0V	59VAC	0V	-.6VDC	0V	95VDC	47VAC	95VDC	--
4	12SQ7	0V	-.6VDC	0V	-.6VDC	-.7VDC	50VDC	23VAC	11VAC	--
5	35L6GT	0V	87VAC	117VDC	95VDC	0V	0V	95VAC	4.4VDC	--
6	35Z5GT	0V	117VAC	113VAC	127VDC	113VAC	0V	87VAC	127VDC	--

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
‡ 1	12AT7	20 KΩ	350KΩ	22KΩ	11Ω	0Ω	200KΩ	22KΩ	1.3Ω	7.5Ω
2	12SA7	0Ω	3.5Ω	200KΩ	200KΩ	22KΩ	.3Ω	23Ω	5Meg.	--
3	12SK7	0Ω	135Ω	0Ω	3Meg.	0Ω	200KΩ	135Ω	200KΩ	--
4	12SQ7	0Ω	10Meg.	0Ω	3Meg.	500KΩ	670KΩ	23Ω	11Ω	--
5	35L6GT	INF	170Ω	200KΩ	200KΩ	470KΩ	INF	135Ω	120Ω	--
6	35Z5GT	INF	200Ω	195Ω	200KΩ	195Ω	0Ω	170Ω	200KΩ	--

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.
VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

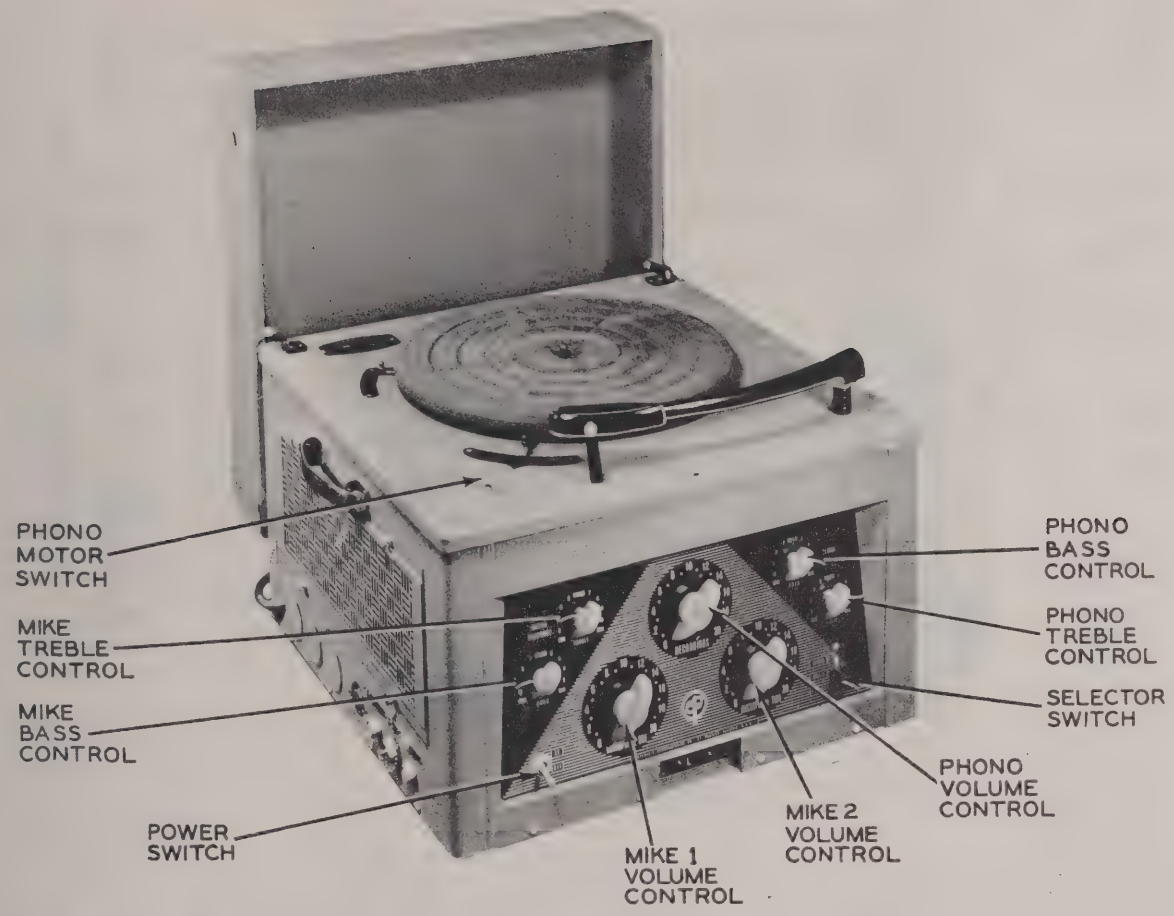
PHOTOFACT* Folder

*TRADE MARK

OPERADIO "SOUNDCASTER" MODELS 530, 531, 1335

OPERADIO "SOUNDCASTER" MODELS 530, 531, 1335

OPERADIO "SOUNDCASTER" MODELS 530, 531, 1335



OPERADIO MODEL 531 "SOUNDCASTER"

TRADE NAME	Operadio "Soundcaster" Models, 530, 531, 1335
MANUFACTURER	Operadio Mfg. Co., St. Charles, Ill.
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (TEN)	Types, (2) 6J7 Mic. Amp., 6J7 AF Amp., 6SN7GT AF Amp.-Phase Inv., (4) 6L6GA Power Output, (2) 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	2.0 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		OPERADIO PART No.	STANDARD REPLACEMENT		
1	Mic.Amp.	6J7	6J7	7R	
2	Mic.Amp.	6J7	6J7	7R	
3	AF Amp.	6J7	6J7	7R	
4	AF Amp.-Ph.Inv.	6SN7GT	6SN7GT	8BD	
5	Power Output	6L6GA	6L6GA	7AC	
6	Power Output	6L6GA	6L6GA	7AC	
7	Power Output	6L6GA	6L6GA	7AC	
8	Power Output	6L6GA	6L6GA	7AC	
9	Rectifier	5U4G	5U4G	5T	
10	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

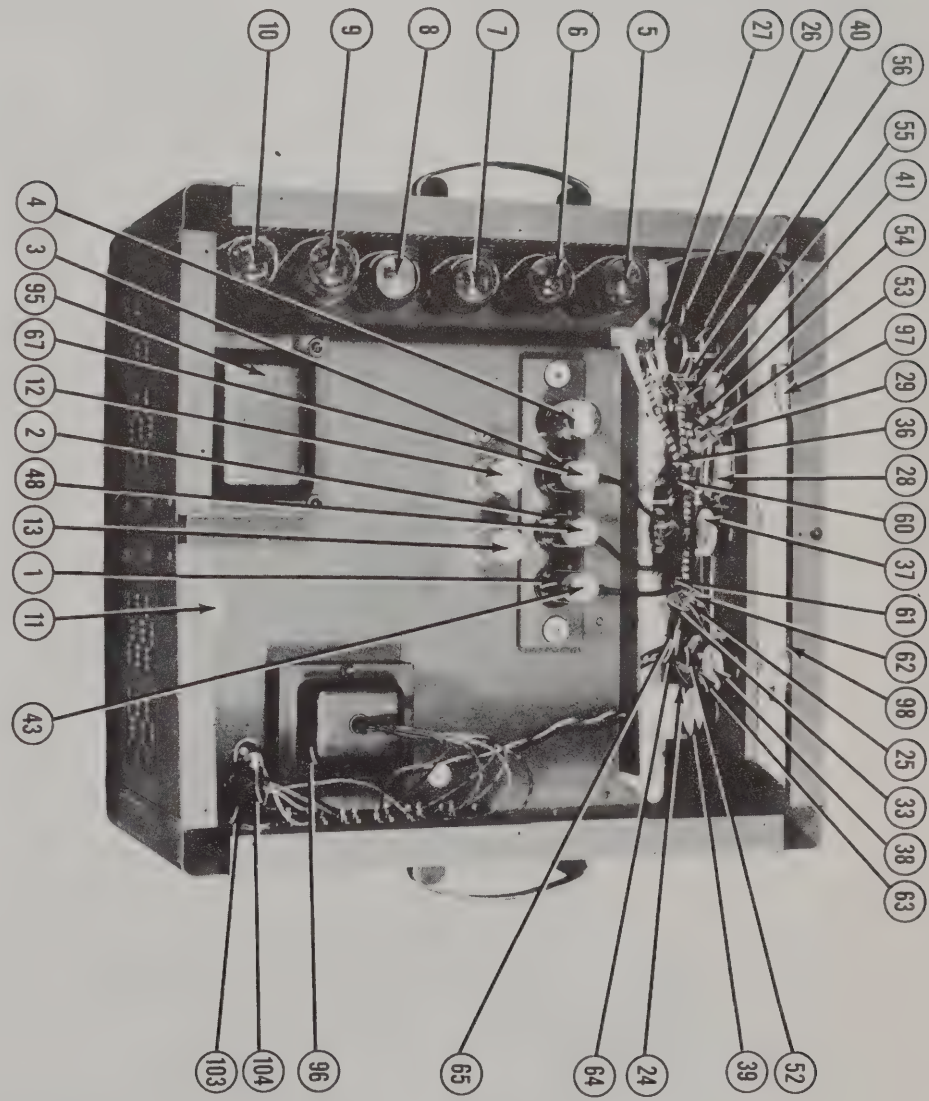
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	OPERADIO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
11	40	500	1992002406			UP2250*	DY-20-525 M-16-525*	Filter
12A	10	450	1999002000	EL-210	AF 22J	UP1145	DY-2X10-450	■ Filter
B	10	450						▲ Filter
13A	10	450	1999006000	EL-310	AF 222J	UP11145	DY-3X10-450	■ Filter
B	5	450						▲ Filter
C	5	450						Filter
14	20	150	1992016206	UT-201	PRS150-20	BR2015	M-20-150	Cathode Bypass
15	20	25	1992001206	TA-25	PRS25-25	BR202A	M-25-25	" "
16	20	25	1992001206	TA-25	PRS25-25	BR202A	M-25-25	" "
17	20	25	1992001206	TA-25	PRS25-25	BR202A	M-25-25	" "
18	.002	1200	1995041202	TR-22	1084-002	MD-1602	STM-16-002	Output Plate Bypass
19	.5	400	1994022504	TC-5	484-.5	DT4P5	SDH-4-5	Audio Coupling
20	.5	400	1994022504	TC-5	484-.5	DT4P5	SDH-4-5	Audio Coupling
21	.5	400	1994022504	TC-5	484-.5	DT4P5	SDH-4-5	Feedback
22	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	Audio Coupling
23	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	AF Screen Bypass
24	0005	600	1994030501	TC-35	1468-0005	DT6T5	ST-6-0005	Tone Comp.
25	001	600	1994030102	TC-21	684-001	DT6D1	ST-6-001	" "
26	001	600	1994030102	TC-21	684-001	DT6D1	ST-6-001	" "
27	001	600	1994030102	TC-21	684-001	DT6D1	ST-6-001	" "
28	003	600	1994030302	TC-23	684-003	DT6D3	ST-6-003	" "
29	001	600	1994030102	TC-21	684-001	DT6D1	ST-6-001	" "
30	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	Audio Coupling
31	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	" "
32	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	Mic.Amp.Screen Bypass
33	.1	400	1994021104	TC-1	484-.1	DT4P1	ST-4-1	" " " "
34	5000	300	1993004502	1FM-25	1467-005	1D5D5	MPH-6-005	Line Filter

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESIST-ANCE	WATTS	OPERADIO PART No.	IRC PART No.	CLAROSTAT PART No.	
35A	500KΩ	½	601-3289	D13-133	M-60Z	Mike 1 Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 35A per instructions
36A	500KΩ	½	601-3289	D13-133	M-60-Z	Mike 2 Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 36A per instructions
37A	500KΩ	½	601-3289	D13-133	M-60-Z	Phono Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 37A per instructions
38A	500KΩ	½	601-3289	D13-133	M-60-Z	Treble Control (Mike)
B	Shaft		Not Req.	A	Not Req.	Attach to 38A per instructions
39A	2.5 Meg.	½	601-3589	D13-140	M-67-Z	Bass Control (Mike)
B	Shaft		Not Req.	A	Not Req.	Attach to 39A per instructions
40	500KΩ- 500KΩ	½	601-7	33-3333		Treble Control (Phono)
41	2.5Meg.	½	601-6			Bass Control (Phono)

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	OPERADIO PART No.	IRC PART No.	
42	2.2 Meg.	1	600-0016-225	BTA-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp.Grid
43	68KΩ	½	600-0043-683	BTS-68K	Blue-Gray-Or. 1st Mic. Amp.Grid
44	1500Ω	1	600-0116-152	BTA-1500	Br.-Grn.-Red 1st Mic. Amp. Cathode
45	560KΩ	1	600-0116-564	BTA-560K	Grn.-Blue-Yl. 1st Mic. Amp. Screen Dropping
46	150KΩ	1	600-0116-154	BTA-150K	Br.-Grn.-Yl. 1st Mic. Amp. Plate Load
47	2.2 Meg.	1	600-0016-225	BTA-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Grid
48	68KΩ	½	600-0043-683	BTS-68K	Blue-Gray-Or. 2nd Mic. Amp. Grid
49	1500Ω	1	600-0116-152	BTA-1500	Br.-Grn.-Red 2nd Mic. Amp. Cathode
50	560KΩ	1	600-0116-564	BTA-560K	Grn.-Blue-Yl. 2nd Mic. Amp. Screen Dropping
51	150KΩ	1	600-0116-154	BTA-150K	Br.-Grn.-Yl. 2nd Mic. Amp. Plate Load
52	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. Series Auxiliary Input
53	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. Tone Compensation
54	47K	1	600-0116-473	BTA-47K	Yl.-Vi.-Or. " "
55	100KΩ	1	600-0116-104	BTA-100K	BR.-Blk.-Yl. Series Phono
56	100KΩ	1	600-0116-104	BTA-100K	" " " " "
57	22KΩ	1	600-0116-223	BTA-22K	Red-Red-Or. Voltage Dropping
58	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. " "
59	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. " "
60	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. Isolation
61	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. "
62	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. Tone Compensation
63	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. " "
64	470KΩ	1	600-0116-474	BTA-470K	Yl.-Vi.-Yl. Isolation
65	270KΩ	1	600-0116-274	BTA-270K	Red-Vi.-Yl. "
66	1500Ω	1	600-0116-152	BTA-1500	Br.-Grn.-Red 1st AF Cathode
67	68KΩ	½	600-0043-683	BTS-68K	Blue-Gray-Or. 1st AF Grid
68	560KΩ	1	600-0116-564	BTA-560K	Grn.-Blue-Yl. 1st AF Screen Dropping
69	150KΩ	1	600-0116-154	BTA-150K	Br.-Grn.-Yl. 1st AF Plate Load
70	560KΩ	1	600-0116-564	BTA-560K	Grn.-Blue-Yl. 2nd AF Grid
71	560Ω	1	600-0116-561	BTA-560	Grn.-Blue-Br. 2nd AF Cathode
72	82Ω	1	600-1004-820	BW-1-82	Gray-Red-Blk. 2nd AF Cathode
73	56KΩ	2	600-0153-563	BT-2-56K	Grn.-Blue-Or. 2nd AF Plate Load
74	56KΩ	2	600-0153-563	BT-2-56K	Grn.-Blue-Or. Phase Inverter Plate Load
75	1000Ω	1	600-0116-102	BTA-1000	Br.-Blk.-Red Phase Inverter Cathode
76	6800Ω	1	600-0116-682	BTA-6800	Blue-Gray-Red Phase Inverter Grid
77	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. Decoupling
78	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. Decoupling
79	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. Output Grid
80	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. Output Grid
81	100Ω	25	600-1018-101	DHA-100	Output Cathode - See Note
82	33KΩ	1	600-0116-333	BTA-33K	Or.-Or.-Or. Series Booster Input
83	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. Parasitic Suppressor
84	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. " "
85	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. Parasitic Suppressor
86	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. " "
87	50Ω	5	600-1008-500	AB-50	" "
88	50Ω	5	600-1008-500	AB-50	" "
89	50Ω	5	600-1008-500	AB-50	" "
90	50Ω	5	600-1008-500	AB-50	" "
91	10K	25	600-1018-103	DHA-10K	Bleeder - See Note
92	10K	10	600-1011-103	AB-10K	Tone Compensation
93	2700Ω	1	600-0116-272	BTA-2700	Red-Vi.-Red Feedback
94	1500Ω	10	600-1011-152	AB-1500	Filter

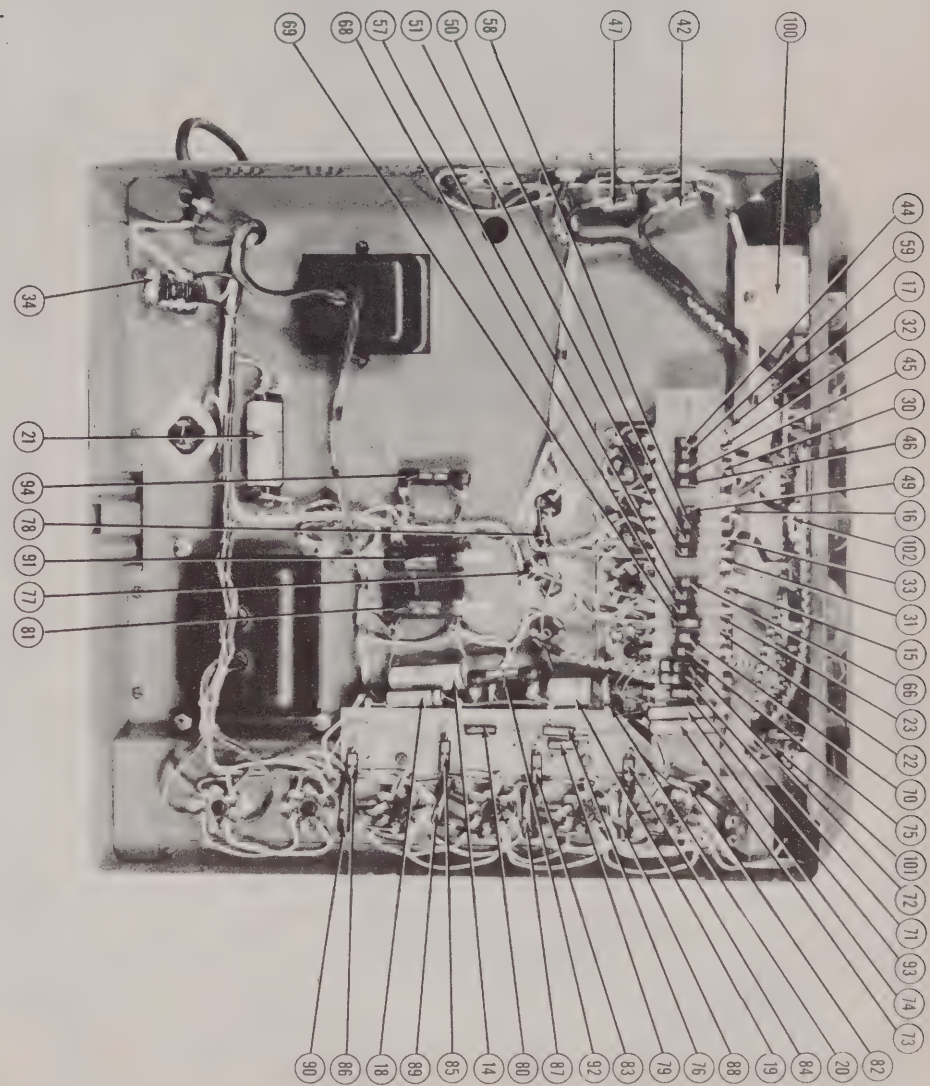
Note-Do not use slider.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	OPERADIO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
95	117VAC @ 2.0A	740VCT @ .27A	5.0VAC @ 6.0A	6.6VCT @ 5.6A	710-4007		T22R35*	

*Drill new mounting holes.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OPERADIO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
96	4500Ω CT	2Ω 4Ω 8Ω 16Ω 31Ω 62Ω 125Ω 250Ω 500Ω	150Ω CT	.06Ω .1Ω .28Ω .6Ω 1.0Ω 1.7Ω 3.0Ω 7.0Ω 13Ω	710-2003	A-3802*	T22S78*		*Drill new mounting holes.

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					OPERADIO PART No.		
97	Bayonet	6-8V	0.15A	Brown			Type 47
98	Bayonet	6-8V	0.15A	Brown			Type 47

PHONO ARM AND CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	OPERADIO PART No.	ASTATIC PART No.	
99A		Model 400	Arm
B		LP-21	Cartridge

MISCELLANEOUS

ITEM No.	PART NAME	OPERADIO PART No.	NOTES
100	Switch	680-8	On-Off
101	Switch	680-22	Micro-Music-Paging
102	Switch	680-23	Paging-Mixing
103	Fuse	320-835-0018	3/16 Amp. Type 3AG
104	Fuse	320-835-0300	3 Amp. Type 3AG

SPEAKER CONNECTIONS

The Operadio Soundcaster is supplied with a 10 contact terminal strip which is provided as a means of connecting the loudspeakers to the proper output impedances. The impedance is plainly marked for each terminal. As an example, from terminal marked COM to terminal 4, it is an output impedance of 4 ohms. The terminal marked COM to 16 gives an output impedance of 16 ohms. From terminal COM to 250 we have an output impedance of 250 ohms, etc.,

For most satisfactory results all loud speakers should be connected in parallel. To find the impedance reflected back to the amplifier from the speaker string, divide the speaker impedance by the total number of speakers. The speaker string should then be connected to the correct output impedance terminal of the amplifier. To use this system however, all speakers must have the same impedance.

SPEAKER PHASING

When using two or more speakers it is desirable to have them properly phased in regard to the motion of the diaphragm. There are two practical ways of checking the phasing.

1. Listening Test; Stand in front of and quite close to the speakers. If speakers are properly phased the sound will seem to come from a point half-way between the speakers. If they are not, the sound will seem to come from the sides and not the front.

2. Battery Test; Apply the voltage from a dry cell to the speaker line. When properly phased all diaphragms will move in the same direction.

PAGING-MIXING SWITCH IN "MIXING" POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0V.	3.3VAC	40VDC	35VDC	1.4VDC	0V.	3.3VAC	1.4VDC	0V.
2	6J7	0V.	3.3VAC	40VDC	35VDC	1.3VDC	0V.	3.3VAC	1.3VDC	0V.
3	6J7	0V.	3.3VAC	70VDC	65VDC	1.6VDC	0V.	3.3VAC	1.6VDC	0V.
4	6SN7	0V.	92VDC	2.6VDC	0V.	81VDC	2VDC	3.3VAC	3.3VAC	-
5	6L6GA	0V.	3.3VAC	400VDC	340VDC	0V.	0V.	3.3VAC	26VDC	-
6	6L6GA	0V.	3.3VAC	400VPC	340VDC	0V.	0V.	3.3VAC	26VDC	-
7	6L6GA	0V.	3.3VAC	400VDC	340VDC	0V.	0V.	3.3VAC	26VDC	-
8	6L6GA	0V.	3.3VAC	400VDC	340VDC	0V.	0V.	3.3VAC	26VDC	-
9	5U4G	0V.	400VDC	0V.	370VAC	0V.	370VAC	0V.	400VDC	-
10	5U4G	0V.	400VDC	0V.	370VAC	0V.	370VAC	0V.	400VDC	-

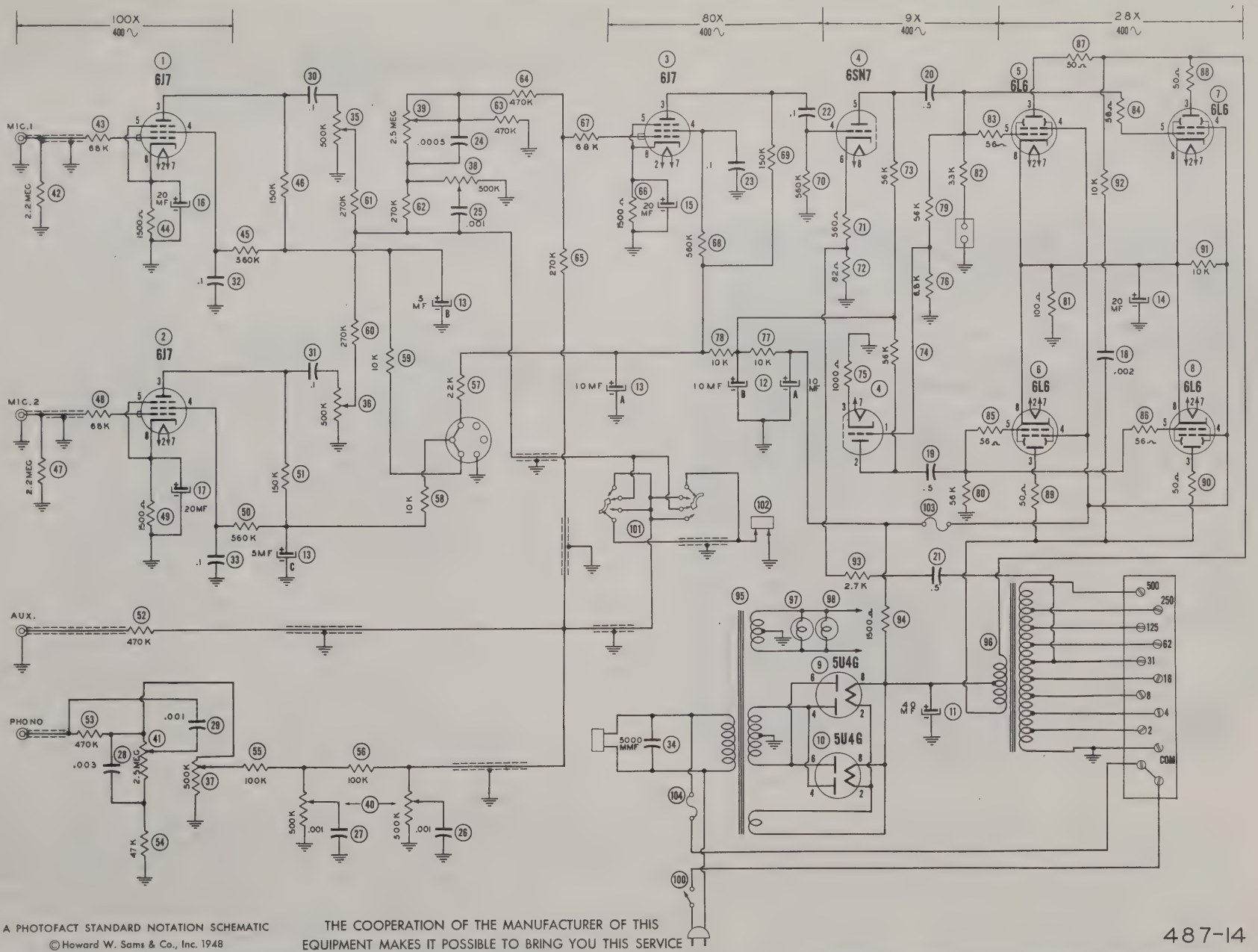
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6J7	0Ω	.05Ω	230KΩ	650KΩ	1.5KΩ	INF.	.05Ω	1.5KΩ	2.5 Meg.
2	6J7	0Ω	.05Ω	230KΩ	650KΩ	1.5KΩ	INF.	.05Ω	1.5KΩ	2.5 Meg.
3	6J7	0Ω	.05Ω	190KΩ	600KΩ	1.5KΩ	INF.	.05Ω	1.5KΩ	310KΩ
4	6SN7	7KΩ	70KΩ	950Ω	580KΩ	70KΩ	650Ω	.05Ω	.05Ω	-
5	6L6GA	0Ω	.05Ω	12KΩ	10KΩ	63KΩ	INF.	.05Ω	100Ω	-
6	6L6GA	0Ω	.05Ω	12KΩ	10KΩ	63KΩ	INF.	.05Ω	100Ω	-
7	6L6GA	0Ω	.05Ω	12KΩ	10KΩ	56KΩ	INF.	.05Ω	100Ω	-
8	6L6GA	0Ω	.05Ω	12KΩ	10KΩ	56KΩ	INF.	.05Ω	100Ω	-
9	5U4G	INF.	11KΩ	INF.	23Ω	INF.	21Ω	INF.	11KΩ	-
10	5U4G	INF.	11KΩ	INF.	23Ω	INF.	21Ω	INF.	11KΩ	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

DATE 3/46-#37-11 SET #37-FOLDER #14


100X
400~
80X
400~
9X
400~
28X
400~
1 6J7
2 6J7
3 6J7
4 6SN7
5 6L6
6 6L6
7 6L6
8 6L6
9 5U4G
10 5U4G
MIC. 1
MIC. 2
AUX.
PHONO
68K
2.2 MEG
1500Ω
20 MF
560K
500K
150K
270K
10K
.0005
.001
.1
.5 MF
5 MF
10 MF
2.2K
470K
100K
47K
.003
2.5 MEG
5000 MMF
2.7K
1000Ω
82Ω
33K
56K
56Ω
100Ω
50Ω
.002
40 MF
500
250
125
62
31
18
8
4
2
COM
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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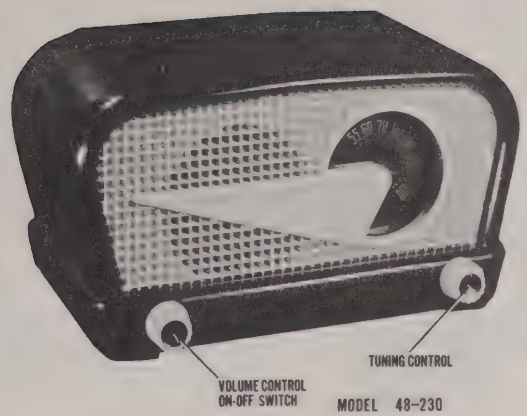
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
487-14

PHILCO MODELS
48-225, 48-230

MODEL 48-225



MODEL 48-230

PHILCO MODELS
48-225, 48-230

PHILCO MODELS 48-225, 48-230

TRADE NAME	Philco, Models 48-225, 48-230
MANUFACTURER	Philco Radio Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (Five)	Types 7A8 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 Power Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1700KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to rear stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully closed.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1600KC	1600KC	Across voice coil	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver.
3		Loop	1400KC	Tune for maximum output	Across voice coil	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	7A8	7A8	8U	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	3525GT	3525GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150		TA-330	PRSA150-20-30	EZ3315	DSB403020-150	Filter-Orange
B	25	150						Filter-Blue
C	20	150		UT-201	PRS150-24	BR2015		Filter-Red
7	.04	400		TC-14	484-05	DT4S4	MPH-4-.05	Line Filter
8	.02	400		TC-12	484-02	DT4S2	S-4-02	Output Plate Bypass
9	.01	400		TC-11	484-01	DT4S1	S-4-01	Audio Coupling
10	.01	400		TC-11	484-01	DT4S1	S-4-01	"
11	.05	200		TC-15	484-05	DT4S5	S-4-05	Screen Bypass
12	.05	200		TC-15	484-05	DT4S5	S-4-05	AVC Filter
13	.2	400						Line Isolation - See Note
14	220	500		1FM-325	146-00025	5W5T25	MO.5-325	Output Grid Bypass
15	47	500		1FM-45	1468-00005	5W5Q5	MO.5-45	Osc.Grid Cap.
16	5	500		MS-55	1468-000005	5W5V5	MO.5-55	Ext.Ant.Coupling

Note: Special Resonant Capacitor

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	33-5429	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions.
C	Switch		Not Req.	41	SW-A	Attach to 17A per instructions.

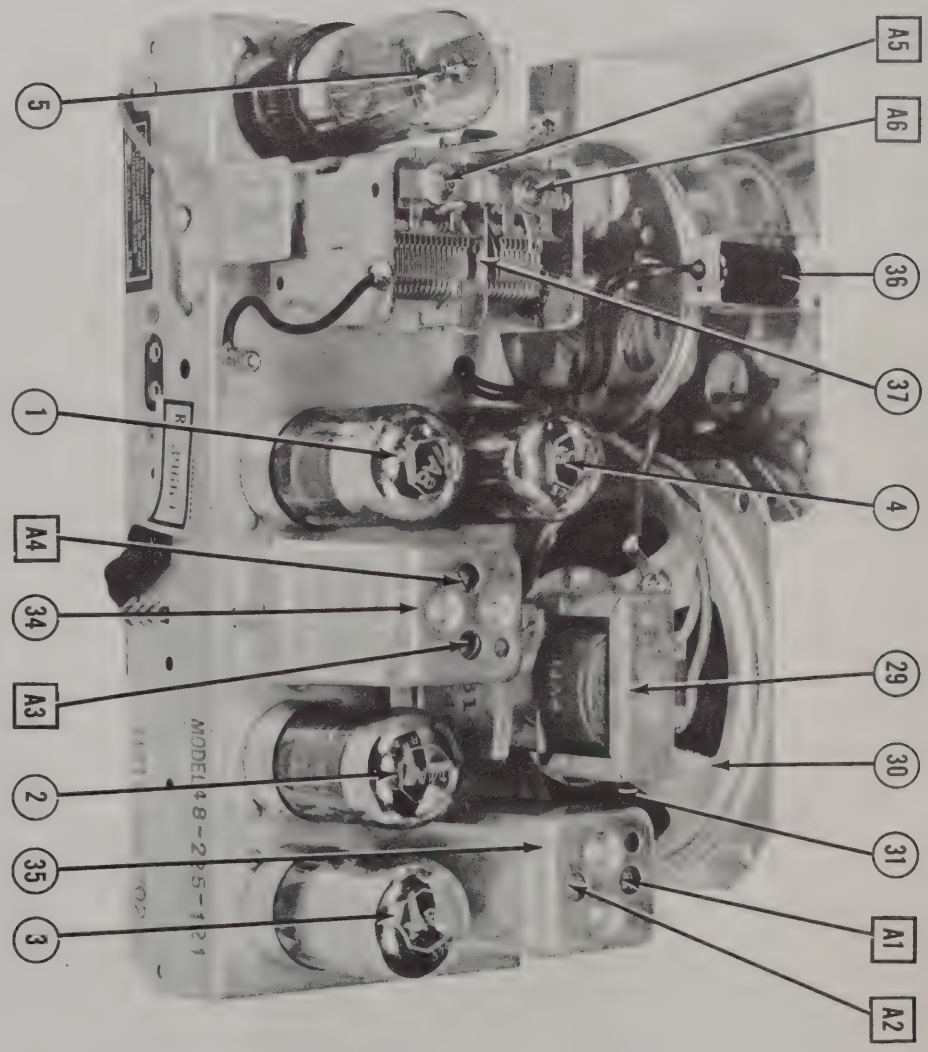
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
18	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Antenna Loading
19	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
20	27KΩ	½		BTS-27K	Red-Vi.-Or. Screen Dropping
21	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
25	130Ω	½		BW-½-120	Br.-Or.-Br. Output Cathode
26	1200Ω	½		BTS-1200	Br.-Red-Red Filter
27	220Ω	1		BW-1-220	Red-Red-Br. Filter
28	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
29	1750Ω	3.1Ω	175Ω	.7Ω	Part of 36-1614	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down. File out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
30	FIELD / PM	VC IMP. 3.2Ω	36-1614	ST-113† Mod.P4-X	4A07†	†Fabricate new mounting bracket.
31	CONE DIA. 4 in.	VC DIA. ½ in.	CONE HAS SPECIAL ADJUSTMENT FEATURE - ORDER FROM MANUFACTURER.			

R F COILS

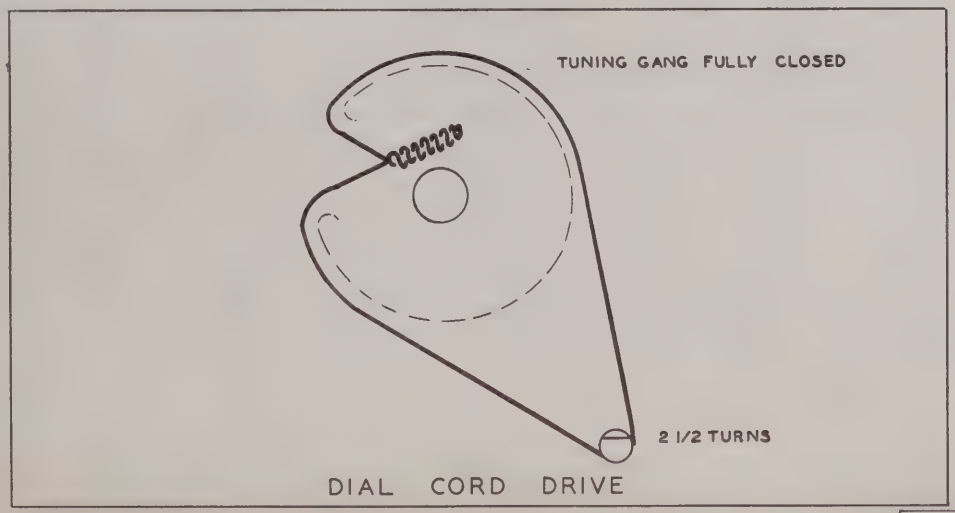
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.
32	Loop Ant.		2.5Ω		
33	OSC Coil	2.2Ω	6.5Ω		14-1060
34	Input IF	25Ω	24Ω		16-6658
35	Output IF	20Ω			16-6670

DIAL LIGHT

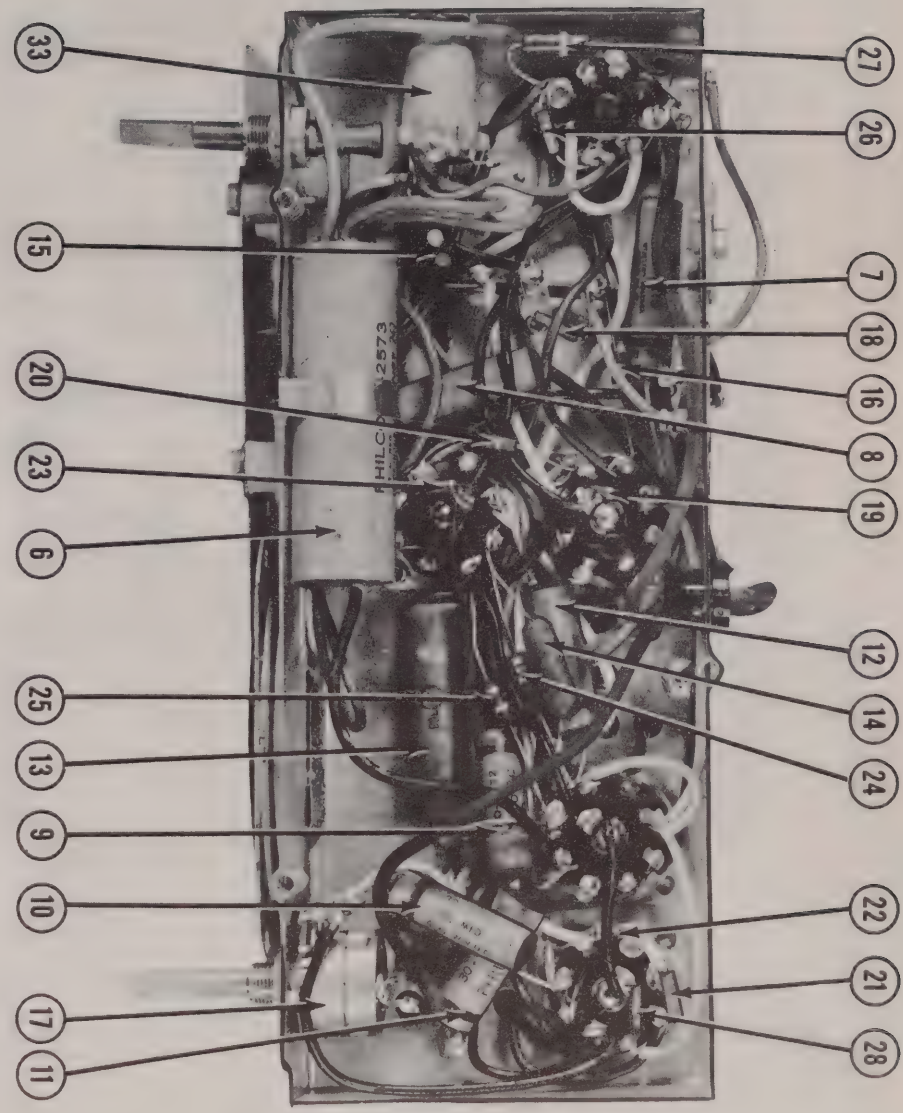
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA	INSTALLATION NOTES
36	Bayonet	6-8V	.15A	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
37	2 Gang Var.Cap.†		(18-479 MMF, 19-165 MMF)

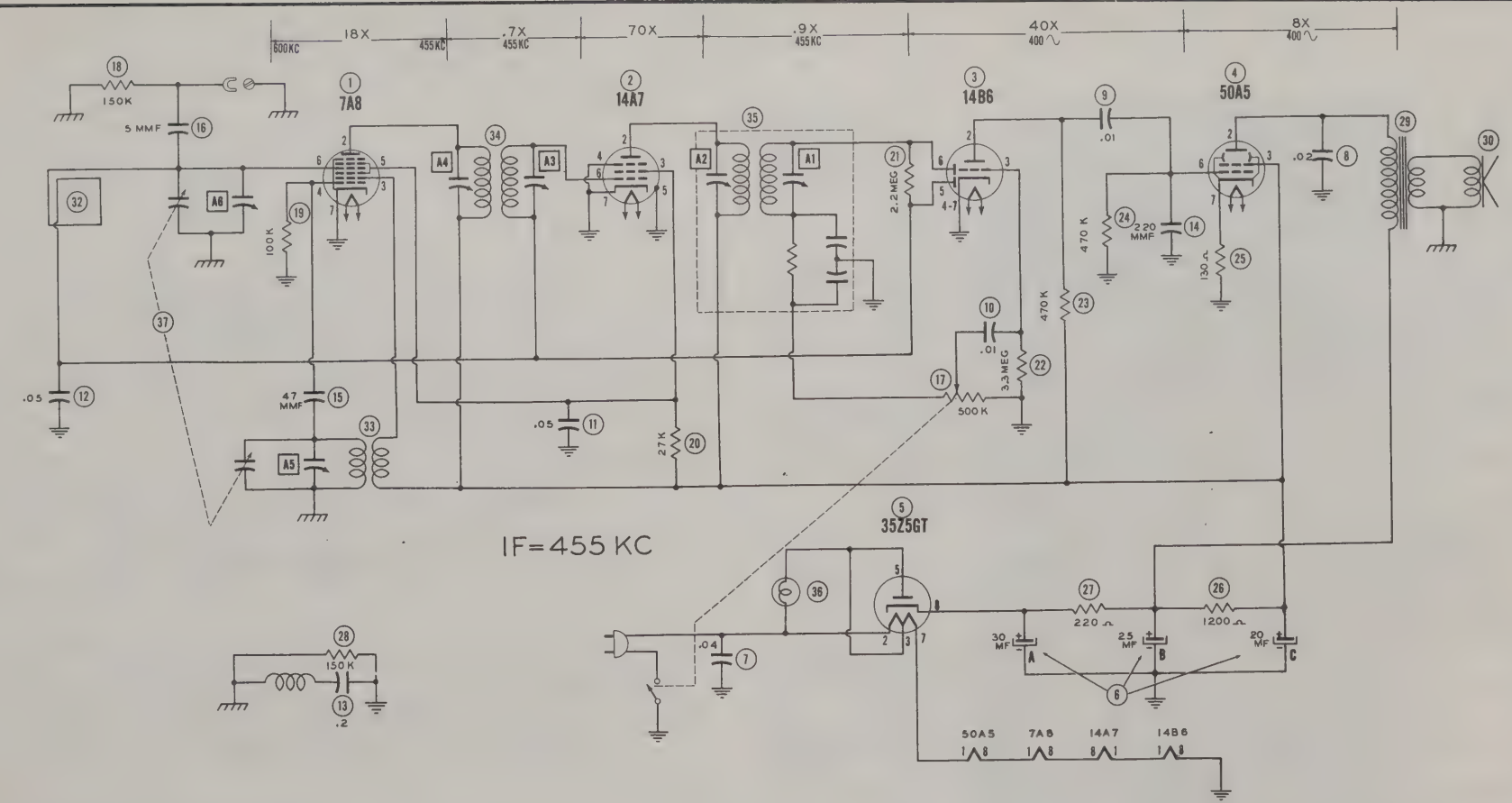


CHASSIS—BOTTOM VIEW



PHILCO MODELS 48-225, 48-230

PHILCO MODELS 48-225, 48-230



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	3?VAC	97VDC	97VDC	-11VDC	47VDC	-.8VDC	0V.	28VAC
2	14A7	13.5VAC	97VDC	47VDC	0V.	0V.	-.8VDC	0V.	28VAC
3	14B6	13.5VAC	49VDC	-.6VDC	0V.	-.6DC	-.6VDC	0V.	0V.
4	50A5	85VAC	105VDC	97VDC	49VDC	-.8VDC	0V.	5.9VDC	35VAC
5	35Z5GT	V.	127VAC	114VAC	97VDC	114VAC	117VDC	85VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	32Ω	100KΩ	100KΩ	100KΩ	127KΩ	3 Meg.	0Ω	25Ω
2	14A7	12.5Ω	100KΩ	127KΩ	0Ω	0Ω	3 Meg.	0Ω	25Ω
3	14B6	12.5Ω	570KΩ	3.3 Meg.	0Ω	3 Meg.	500KΩ	0Ω	0Ω
4	50A5	80Ω	100KΩ	100KΩ	570KΩ	3 Meg.	470KΩ	130Ω	32Ω
5	35Z5GT	INF	110Ω	105Ω	100KΩ	105Ω	100KΩ	80Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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487-15

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

PHILCO MODEL
48-206

PHILCO MODEL
48-206

PHILCO MODEL 48-206

TRADE NAME	Philco, Model 48-206
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 7A8 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 or 50L6GT Power Output, 35Z5GT or 35Y4 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to reference dot at left of dial number "55".

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) 7A8. Low side to B-.	455KC	540KC	Across voice coil	A1,A2, A3,A4.	Turn A4 down tight. Adjust A1, A2, A3 and A4 for maximum output. If isolation transformer is not used reduce dummy to .001 MFD. to reduce hum modulation.
2	100MMFD	Disconnect ext. ant. lug from chassis. High side to ext. ant. lead. Low side to B-.	1600KC	1600KC	"	A5	Adjust for maximum output.
3	100MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

HOWARD W. SAMS & CO., INC. Indianapolis . . Indiana

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PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 48-206

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	7A8	7A8	8U	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4A	Power Output	50A5	50A5	6AA	
B	" "	50L6GT	50L6GT	7AC	Used in later production
5A	Rectifier	35Z5GT	35Z5GT	6AD	
B	"	35Y4	35Y4	5AL	Used in later production.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150		TA-330	PRSA150-20-30	BZ42215	DSB-403020-150	Filter-Or.
B	25	150						" -Blue
C	20	150		UT-201	PRS150-20			" -Red
7	.04	400		TC-14	484-05	DT4S4	ST-4-05	Line Filter
8	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.01	400		TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.007	400		TC-26	484-0075	DT6D6	ST-6-006	" "
11	.05	200		TC-15	484-05	DT2S5	ST-4-05	Screen Bypass
12	.05	200		TC-15	484-05	DT2S5	ST-4-05	AVC Filter
13	.2	400						Line Isolation-See Note
14	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	Output Grid Bypass
15	47	500		1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.
16	5	500		MS-55	1468-000005	5W5V5	MO.5-55	Ext. Ant. Coupling

Note-Special inductive wound resonant capacitor.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	33-5429	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

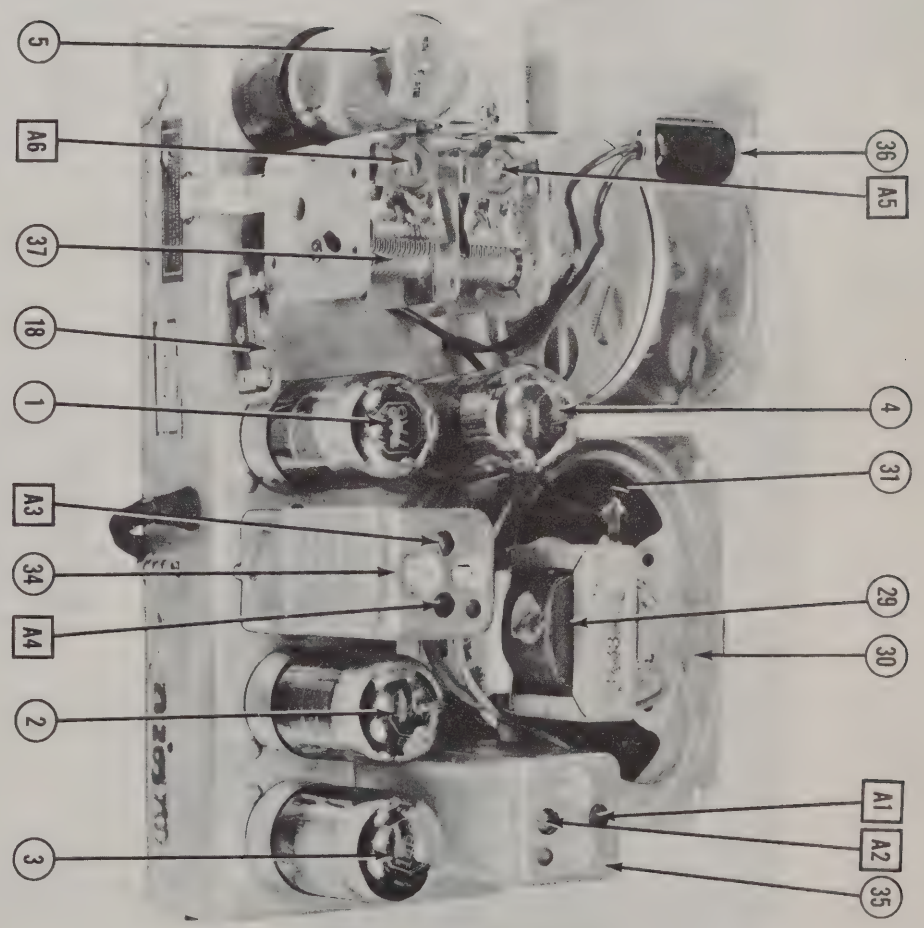
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
18	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Antenna Loading
19	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
20	27KΩ	½		BTS-27K	Red-Vi.-Or. Screen Dropping
21	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
22	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
23	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
25	130Ω	½		BW-½-120	Br.-Or.-Br. Output Cathode
26	220Ω	1		BW-1-220	Red-Red-Br. Filter
27	1200Ω	½		BTS-1200	Br.-Red-Red "
28	150KΩ	½		BTS-150K	Br.-Grn.-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
29	17500Ω	3.1Ω	175Ω	.7Ω	Part of 36-1614	A-3876†	T22S45†	A-2928†	†Bend mounting tabs down file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113#		
30	PM	3.1Ω	36-1614	Mod. P4-X	4A07#	#Fabricate new mounting bracket.
	CONE DIA.	VC DIA.				
31	4"	1/2"				

R F COILS

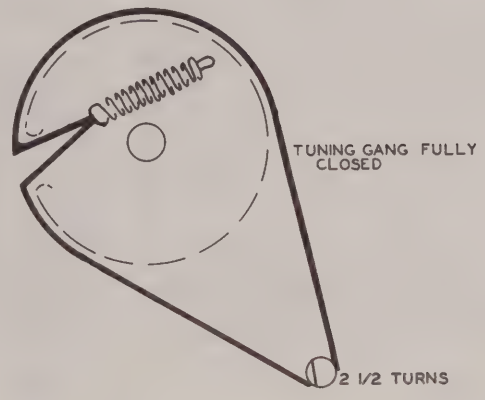
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.
32	Loop Ant.		3Ω		
33	Osc. Coil	2Ω	6Ω		14-1060
34	Input IF	27Ω	27Ω		16-6658
35	Output IF	21Ω			16-6670

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA	INSTALLATION NOTES
36	Bayonet	6-8	0.15	Brown			Type 47

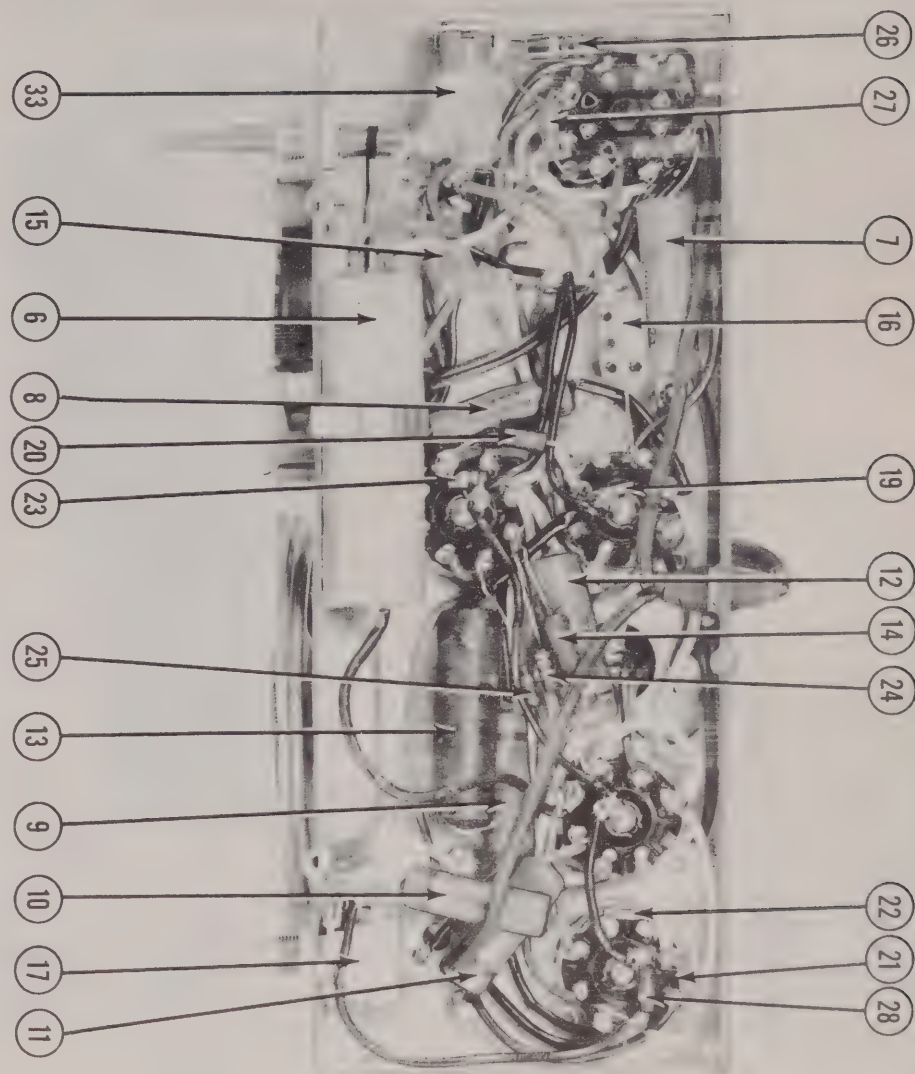
MISCELLANEOUS

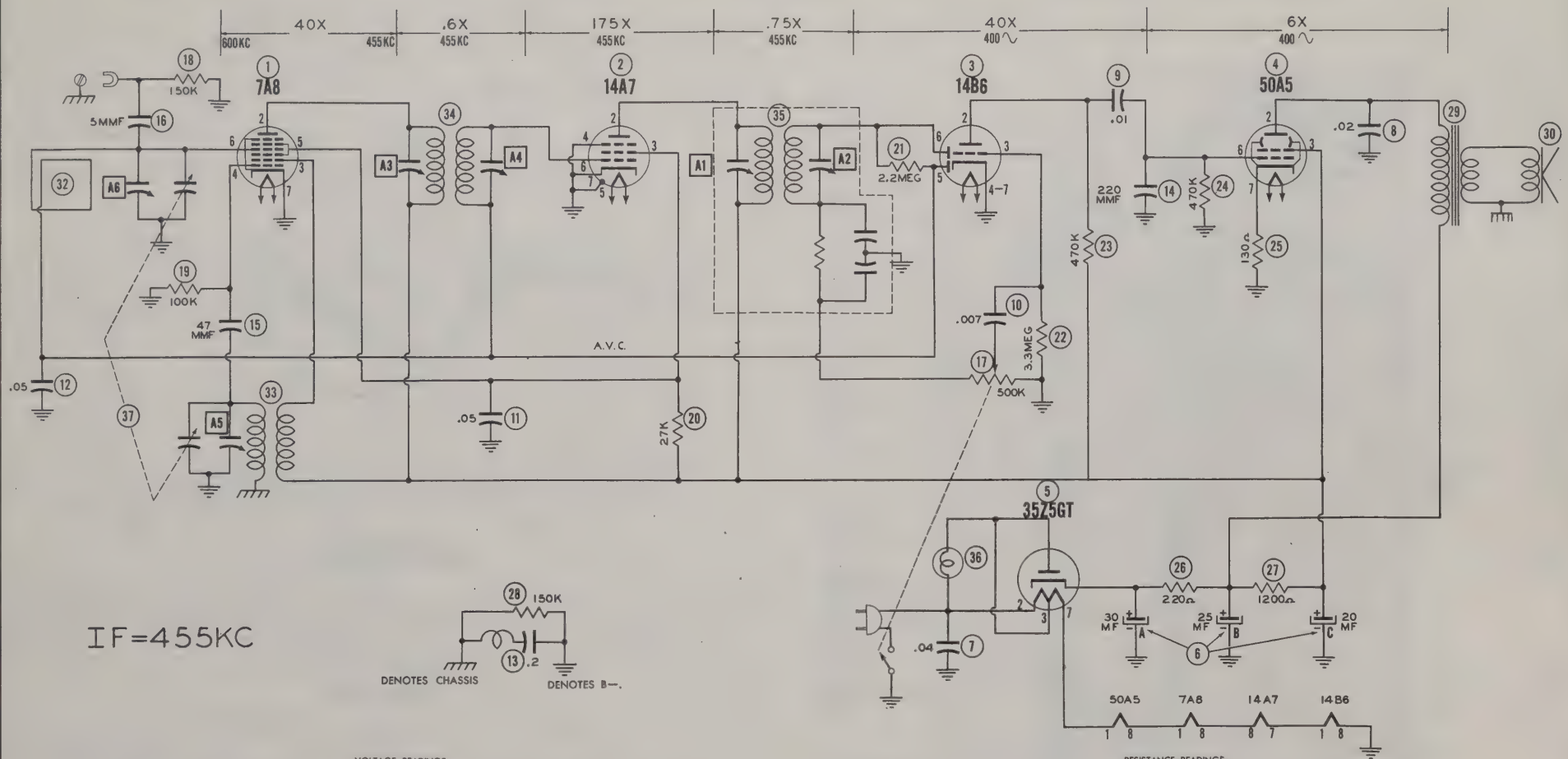
ITEM No.	PART NAME	PHILCO PART No.	NOTES
37	2 Gang Var. Cap.		(21-503MMF, 27-174 MMF)



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	32.5VAC	96VDC	96VDC	§-15VDC	42VDC	-.7VDC	0V	25VAC
2	14A7	13VAC	96VDC	42VDC	0V	0V	-.7VDC	0V	25VAC
3	14B6	13VAC	50VDC	-.6VDC	0V	-.7VDC	-.7VDC	0V	0V
4	50A5	85VAC	105VDC	100VDC	50VDC	-.7VDC	0V	6VDC	32.5VAC
5	35Z5	0V	117VAC	112VAC	96VDC	112VAC	110VDC	85VAC	122VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A8	32Ω	60KΩ	60KΩ	100KΩ	98KΩ	2.7Meg.	0Ω	25Ω
2	14A7	13Ω	60KΩ	88KΩ	0Ω	0Ω	2.7Meg.	0Ω	25Ω
3	14B6	13Ω	500KΩ	3.3Meg.	0Ω	2.7Meg.	.5Meg.	0Ω	0Ω
4	50A5	80Ω	60KΩ	60KΩ	500KΩ	2.7Meg.	470KΩ	125Ω	32Ω
5	35Z5	INF.	115Ω	105Ω	60KΩ	105Ω	60KΩ	80Ω	60KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

487-16

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODEL
48-300

PHILCO MODEL
48-300

PHILCO MODEL 48-300

TRADE NAME	Philco, Model 48-300
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output, 117Z3 Rectifier.
POWER SUPPLY RATING	105-120 Volts AC-DC or 7.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .18 Amp. @ 117 Volts AC or 53MA @ 7.5 Volts DC and 11MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to ext. ant. lead. (Disconnected from chassis.)Low side to B-.	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2, A3	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
	INSTALL RECEIVER IN CABINET. TURN TUNING CAP. FULLY CLOSED AND SET POINTER TO LAST REFERENCE MARK AT LOW FREQUENCY END OF DIAL.						
2		Loop	1600KC	1600KC	"	A4	Fashion loop of several turns of wire and radiate signal into receiver. Adjust for maximum output.
3		"	1600KC	Tune for maximum output.	"	A5	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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DATE 3/48-#487-17 SET #37-FOLDER #17

PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 48-[illegible]

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	
5	Rectifier	117Z3	117Z3	4BR	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150	30-2560	EL-313*	AF64D4A*	UP3325C*	DY-303	Filter - Or.
B	10	150						" - Br.
C	30	150						" - Red
D	30	25		TA-50	PRS150-20	BR1215	M-30-150	Cathode Bypass-Yl.
7	.04	400	45-3500-2	TC-14	484-04	DT4S4	ST-6-04	Line Filter
8	.004	600	61-0179	TC-24	684-004	DT6D4	ST-6-004	Output Plate Bypass
9	.004	600	61-0179	TC-24	684-004	DT6D4	ST-6-004	Audio Coupling
10	.05	200	61-0122	TC-15	484-05	DT2S5	ST-4-05	AF Screen Bypass
11	.01	400	61-0120	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
12	.1	200	61-0113	TC-1	484-.1	DT2P1	ST-2-1	Screen Bypass
13	.25	100	61-0125	TC-2	484-.25	DT2P25	ST-2-25	Filament Bypass
14	.1	400	61-0113	TC-1	484-.1	DT4P1	ST-4-1	Line Isolation
15	.05	200	61-0122	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
16	250	500	30-1227-9	5W5T25	1463-00025	5W5T25	MO.5-325	Output Grid Bypass-Cer.
17	3	500	30-1221					Feedback-Cer.
18	7.5	500	30-1224-5					Ext. Ant. Coupling-Cer.
19	1.5	500	30-1221-3					Neutralizing Cap.-Cer.

*Punch chassis from 1" can.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20	1 Meg.	½	33-5526			Volume Control & Sw.

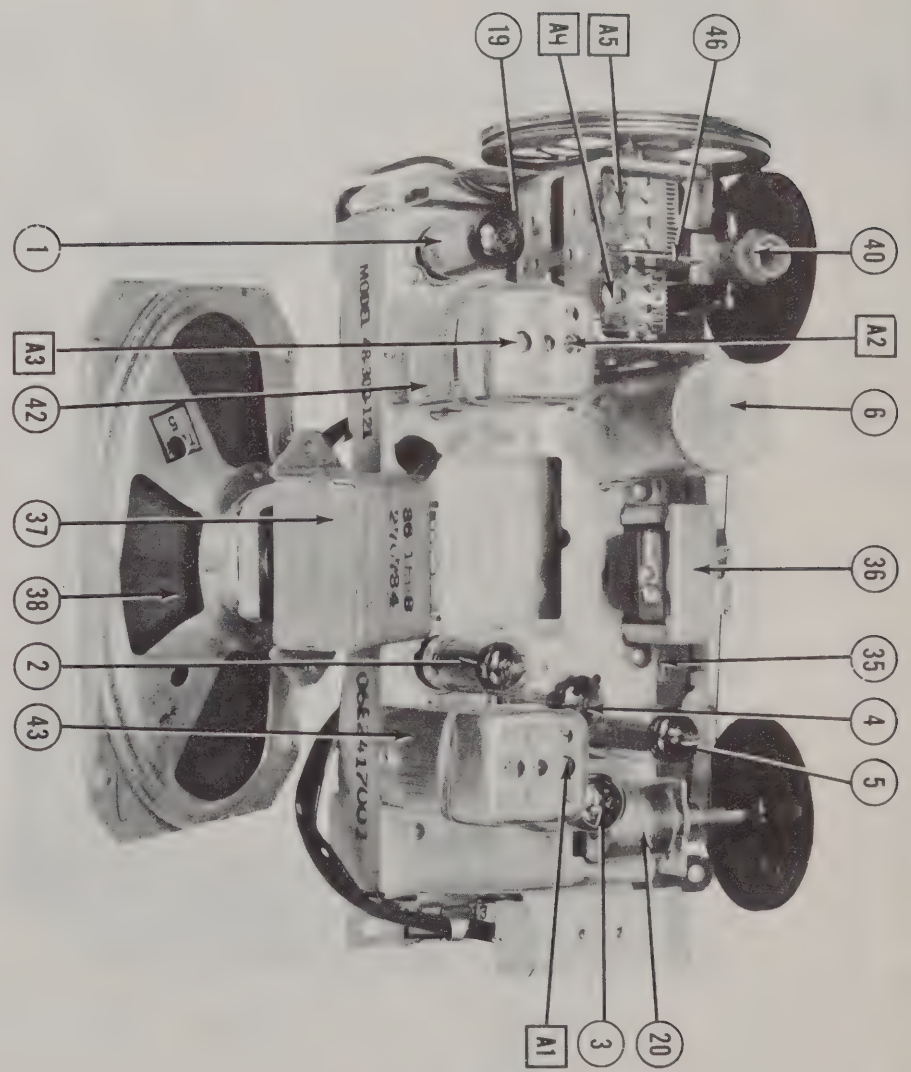
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
21	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
22	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Antenna Loading
23	100KΩ	2	66-4103340	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
24	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Voltage Dropping
25	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
26	470Ω	½	66-1473340	BTS-470	Yl.-Vi.-Br. Filament String
27	270Ω	½	66-1273340	BW-½-270	Red-Vi.-Br. " "
28	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
29	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Screen Dropping
30	1.2 Meg.	½	66-5123340	BTS-1.2 Meg.	Br.-Red-Grn. AF Plate Load
31	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
32	680Ω	½	66-1683340	BTS-680	Blue-Gray-Br. Filament String
33	15[illegible]	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation
34	2[illegible]Ω	½	66-2223340	BTS-2200	Red-Red-Red Filter
35A	68Ω				Surge Limiter
B	47Ω				Filament Dropping
C	47Ω				" "

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
36	11000	3.3Ω	460Ω	.4Ω	32-8259	A-3879	T22S47	A-2932	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
37	FIELD	VC IMP.	36-1198			
	[illegible]	3.5Ω				
38	[illegible] DIA.	VC DIA.				
	5" x 6"	1/2"				

R F COILS

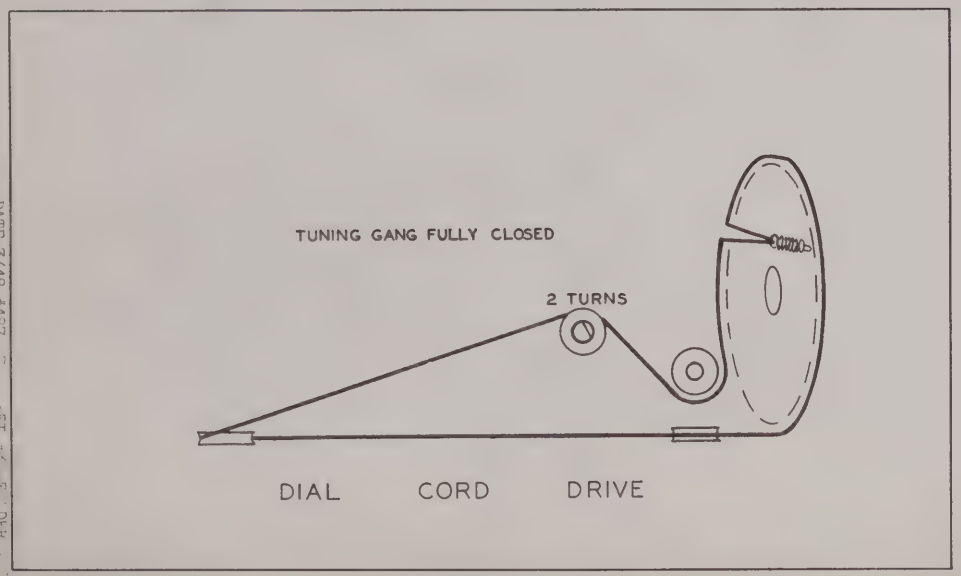
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.	
39	Loop Ant.		2.2Ω	32-4052-17		
40	Ant. Load. Coil		1.8Ω	32-4220		
41	Osc. Coil	2Ω	5.9Ω	32-4095-3	14-1060†	†Add 50MMF from osc. grid to high side tuning cap.
42	Input IF	24Ω	23.5Ω	32-3968-4	16-6668	
43	Output IF	40Ω		32-3987-1		

BATTERIES

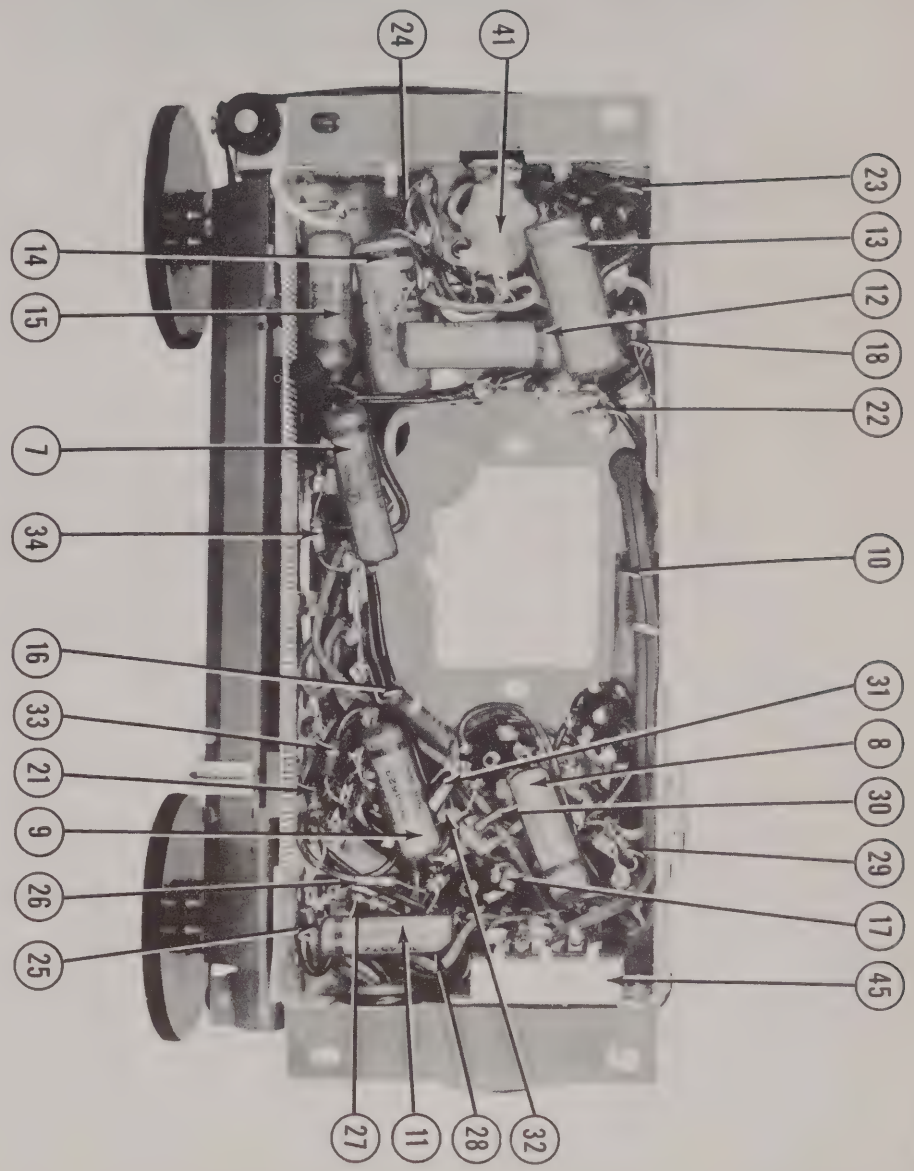
ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
44	1.5V "A" 90V "B"	P-841A			#753			F6A60	

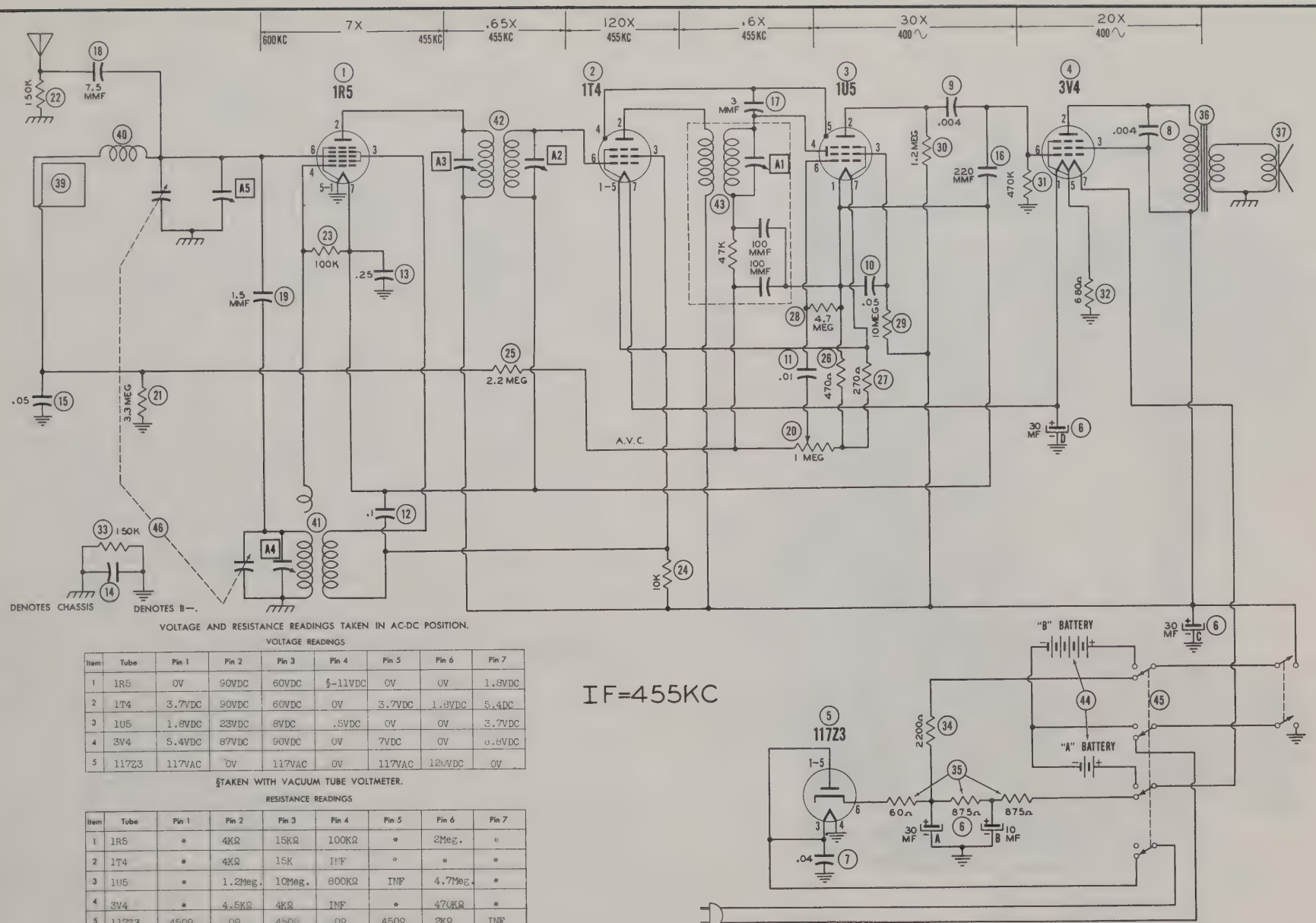
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
45	Switch	42-1421	AC-DC-Batt.
46	2 Gang Var. Cap.	31-2692	(30-500MMF, 17-165MMF)
	Dial Scale	27-5982	
	Dial Pointer	76-2470	
	Knob	54-4212-2	



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V	90VDC	60VDC	§-11VDC	0V	0V	1.8VDC
2	1T4	3.7VDC	90VDC	60VDC	0V	3.7VDC	1.8VDC	5.4DC
3	1U5	1.8VDC	23VDC	8VDC	.5VDC	0V	0V	3.7VDC
4	3V4	5.4VDC	87VDC	90VDC	0V	7VDC	0V	0.8VDC
5	117Z3	117VAC	0V	117VAC	0V	117VAC	120VDC	0V

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	4KΩ	15KΩ	100KΩ	*	2Meg.	*
2	1T4	*	4KΩ	15K	INF	*	*	*
3	1U5	*	1.2Meg.	10Meg.	800KΩ	INF	4.7Meg.	*
4	3V4	*	4.5KΩ	4KΩ	INF	*	470KΩ	*
5	117Z3	450Ω	0Ω	450Ω	0Ω	450Ω	2KΩ	INF

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

IF=455KC

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

487-17

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin 7 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

PILOT MODEL T-741

TRADE NAME	Pilot, Model T-741
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City, N.Y.
TYPE SET	AC-DC Operated Multi-Band Superheterodyne Receiver
TUBES (SEVEN)	Types, 6SB7Y Converter, 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6H6 Det., 6SJ7 1st AF, 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	105-125 or 220-240 Volts AC-DC RATING .49 Amp. @ 117 Volts AC
SHORT WAVE TUNING RANGE—BROADCAST	2.45-7.65MC, 7.35-22.5MC, 9.46-9.74MC, 11.53-12.12MC 535-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to mark under the letters MC or KC. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front large stator of tuning cap. Low side to B-.	455KC	BC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4, A5.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to "A" terminal on ant. terminal post. (Connect "D" to "G"). Low side to "G".	"	"	"	"	A6	Adjust for minimum output.
3	200MMFD	"	1500KC	"	1500KC	"	A7,A8	Adjust for maximum output.
4	200MMFD	"	600KC	"	Tune for maximum output.	"	A9	Rock tuning cap. and adjust for maximum output. Repeat Steps 3 & 4 until no further improvement can be made making Step 3 the last adjustment.
5	400Ω carbon res.	"	6.5MC	SW 1	6.5MC	"	A10	Adjust for maximum output.
6	"	"	"	"	Tune for maximum output.	"	A11	Rock tuning cap. and adjust for maximum output.
7	"	"	18.0MC	SW 2	18.0MC	"	A12	Adjust for maximum output
8	"	"	"	"	Tune for maximum output.	"	A13	Rock tuning cap. and adjust for maximum output.
9	"	"	9.5MC	31 meter bandspread	9.5MC	"	A14	Adjust for maximum output
10	"	"	"	"	Tune for maximum output.	"	A15	Rock tuning cap. and adjust for maximum output.
11	"	"	12.0MC	25 meter bandspread	12.0MC	"	A16	Adjust for maximum output.
12	"	"	"	"	Tune for maximum output.	"	A17	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PILOT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SB7Y	6SB7Y	8R	
2	1st IF Amp.	6SG7	6SG7	8BK	
3	2nd IF Amp.	6SG7	6SG7	8BK	
4	Detector	6H6	6H6	7Q	
5	1st AF	6SJ7	6SJ7	8N	
6	Power Output	25L6GT	25L6GT	7AC	
7	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

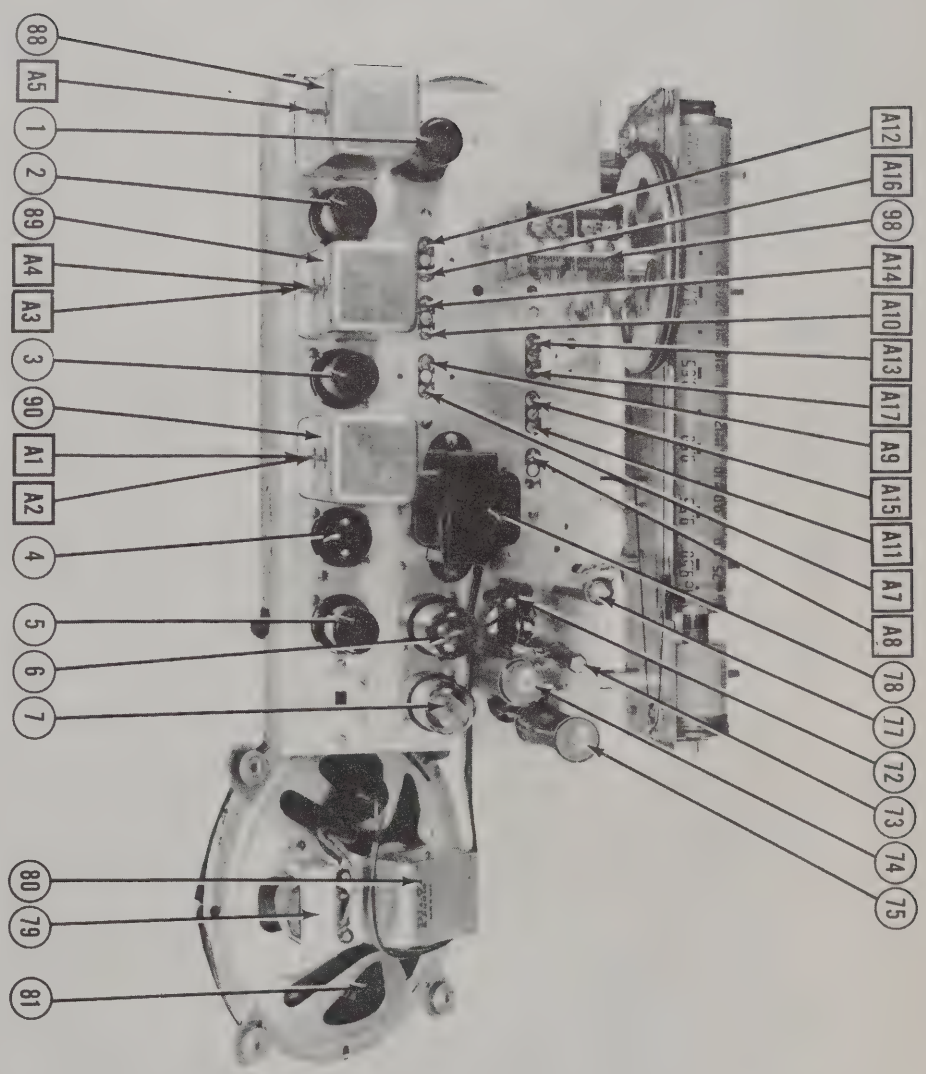
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PILOT PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	50	150	24-37	UT-501	PRSA150-30-50*	BR5015	M-50-150	▲ Filter
B	120	150		EL-340*	AF20D	UP84215*	DH-2x50-150*	■ "
9	4	250	24-74	UT-42	PRS150-4	BR425	M-4-450	Surge Limiter
10	25	25	24-64	TA-25	PRSA25-25	BR252A	M-25-25	Cathode Bypass
11	25	25	24-64	TA-25	PRSA25-25	BR252A	M-25-25	" "
12	.1	600	22-37	TC-1	684-.1	DT6P1	MPH-6-1	Line Filter
13	.005	600	22-11	TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
14	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
15	.05	400	22-28	TC-15	484-05	DT4S5	ST-4-05	AF Screen Bypass
16	.1	400	22-36	TC-1	484-.1	DT4P1	ST-4-1	AF Plate Decoupling
17	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	RF Bypass
18	.01	600	22-50	TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
19	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Line Isolation
20	.003	600	22-62	TC-23	684-003	DT6D3	ST-6-003	Tone Compensation
21	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
22	.1	400	22-36	TC-1	484-.1	DT4P1	ST-4-1	Phono Isolation
23	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	RF Bypass
24	.05	400	22-28	TC-15	484-05	DT4S5	ST-4-05	2nd IF Decoupling
25	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	2nd IF Cathode Bypass
26	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	RF Bypass
27	.05	400	22-30	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
28	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	RF Bypass Power Supply
29	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	1st IF Decoupling
30	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	1st IF Cathode Bypass
31	.1	400	22-36	TC-1	484-.1	DT4P1	ST-4-1	RF Bypass
32	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Conv. Screen Bypass
33	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Conv. Decoupling
34	.05	400	22-30	TC-15	484-05	DT4S5	ST-4-05	Osc. Feedback
35	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	RF Bypass
36	.01	400	22-17	TC-11	484-01	DT4S1	ST-4-01	Ext. Ground Isolation
37	100		20-14	1FM-31	1468-0001	5W5T1	MO.5-31	Tone Comp.
38	100		20-14	1FM-31	1468-0001	5W5T1	MO.5-31	" "
39	400		20-121	1FM-34	1468-0004	5W5T4	MO.5-34	Diode RF Filter
40	100		20-14	1FM-34	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
41	300		21-43	MS-33	1469-0003	5R5T3	MOS.5-33	Fixed Pad
42	2142		21-42					" "
43	6000		21-44	MS-26				" "
44	100		20-14	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling
45	100		20-14	1FM-31	1468-0001	5W5T1	MO.5-31	Filament Bypass
46	5000		20-115	1FM-25	1467-005	1D5D5	MW.5-25	" "

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PILOT PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
47A	1 Meg.	½	36-21	D13-137X	AM-63-Z	Volume Control tapped @ 300KΩ
B	Shaft		Not Req.	A & C3	FS-5	Attach to 47A per instructions
C	Switch		" "	41	SW-A	" " " " "
48	500KΩ	½	37-12			Tone Control

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PILOT PART No.	IRC PART No.	
49	1 Meg.	½	30-277	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
50	20Ω	½	30-8	BW-½-22	Red-Blk.-Blk. Parasitic Suppressor
51	22KΩ	½	30-266	BTS-22K	Red-Red-Or. Oscillator Grid
52	1000Ω	½	30-264	BTS-1000	Br.-Blk.-Red Converter Screen Dropping
53	150Ω	½	31-81	BW-½-150	Br.-Grn.-Br. 1st IF Cathode
54	2200Ω	½	30-380	BTS-2200	Red-Red-Red 1st IF Decoupling
55	47KΩ	½	30-267	BTS-47K	Yl.-Vi.-Or. 2nd IF Transformer Shunt
56	150Ω	½	31-81	BW-½-150	Br.-Grn.-Br. 2nd IF Cathode
57	2200Ω	½	30-380	BTS-2200	Red-Red-Red 2nd IF Decoupling
58	47KΩ	½	30-267	BTS-47K	Yl.-Vi.-Or. 3rd IF Transformer Shunt
59	1 Meg.	½	30-277	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
60	3.9 Meg.	½	30-375	BTS-3.9 Meg.	Or.-White-Grn. AF Grid
61	1800Ω	½	30-411	BTS-1800	Br.-Gray-Red AF Cathode
62	1 Meg.	½	30-277	BTS-1 Meg.	Br.-Blk.-Grn. AF Screen Dropping
63	220KΩ	½	30-271	BTS-220K	Red-Red-Yl. AF Plate Load
64	120KΩ	½	30-312	BTS-120K	Br.-Red-Yl. AF Plate Decoupling
65	150Ω	½	31-81	BW-½-150	Br.-Grn.-Br. Output Cathode
66	22KΩ	½	30-266	BTS-22K	Red-Red-Or. Tone Compensation
67	120KΩ	½	30-312	BTS-120K	Br.-Red-Yl. Diode Load
68	100KΩ	½	30-270	BTS-100K	Br.-Blk.-Yl. Tone Compensation
69	1 Meg.	½	30-277	BTS-1 Meg.	Br.-Blk.-Grn. Phono Shunt
70	120KΩ	½	30-312	BTS-120K	Br.-Red-Yl. Tone Compensation
71	68KΩ	½	30-268	BTS-68K	Blue-Gray-Or. Line Isolation
72	1250Ω	25	31-92	DG-1250	Line Dropping
73	1500Ω	20	31-91	DG-1500	Line Dropping
74	188Ω	30	31-93	EPA-200	Line Dropping-See Note 1
75	188Ω	30	31-93	EPA-200	" " " "
76	10Ω	2	30-412	BW-2-10	" "
77	100Ω	25	31-77	DHA-100	" "
99	1000Ω	½	30-264	BTS-1000	Br.-Blk.-Red Limit Resistor-See Note 2

Note 1 -On IRC replacement set slider at 188Ω from one end.
Note 2 -Not used in all models.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	PILOT PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
78	.085A	110Ω	4.5 Henries	57-9	C-2303†			†Drill one new mounting hole.

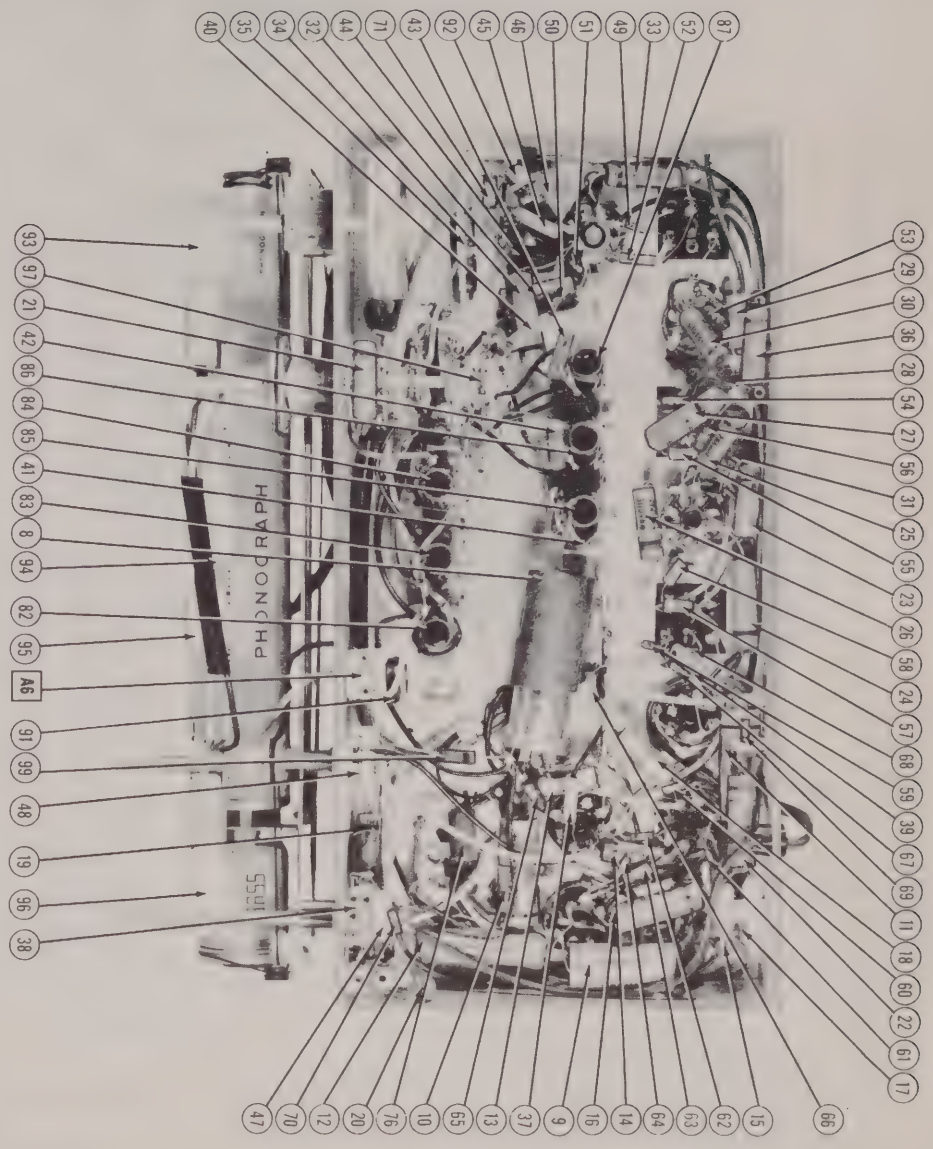
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PILOT PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
79	2900Ω	3.8Ω	190Ω	.6Ω	Part of 41-16	A-3876†	T-28845†	A-2928†	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PILOT PART No.	JENSEN PART No.	QUAM PART No.	
80	FIELD	VC IMP.	41-16	ST-115† Mod. P8-V	8A21†	†Fabricate new mounting brackets.
	PM	3.8Ω				
81	CONE DIA. 7½"	VC DIA. 3/4"				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

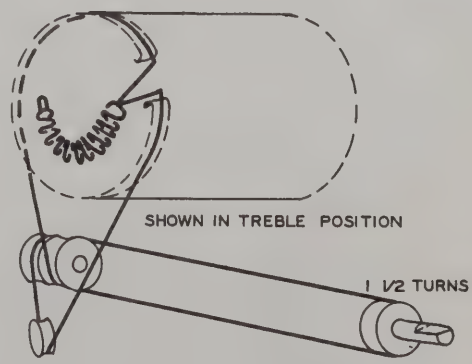
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PILOT PART No.	REPLACEMENT DATA MEISSNER PART No.	
82	BC Ant.Coil	24Ω	2.2Ω	70-61		
83	SW 1 " "	.9Ω	.5Ω	70-59		
84	SW 2 " "	.4Ω	.1Ω	70-60		
85	BC Osc. "	1Ω	2.5Ω	72-39		
86	SW 1 " "		.1Ω	72-50		
87	SW 2 " "		0Ω	72-51		
88	Input IF	.9Ω		273-107		
89	Inter. IF	1.8Ω	2.7Ω	273-88		
90	Output IF	2.8Ω	2.8Ω	273-89		
91	Wave Trap		23.9Ω	79-63		
92	RF Choke		1.8Ω	75-11		

DIAL LIGHT

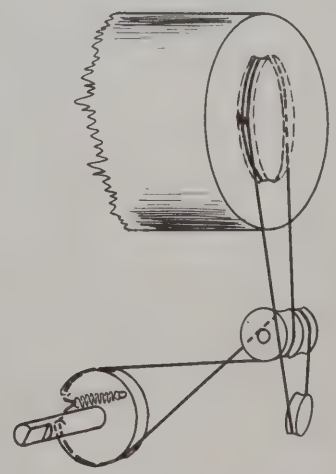
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PILOT PART No.		INSTALLATION NOTES
93-96	Screw	120					Type 7C7

MISCELLANEOUS

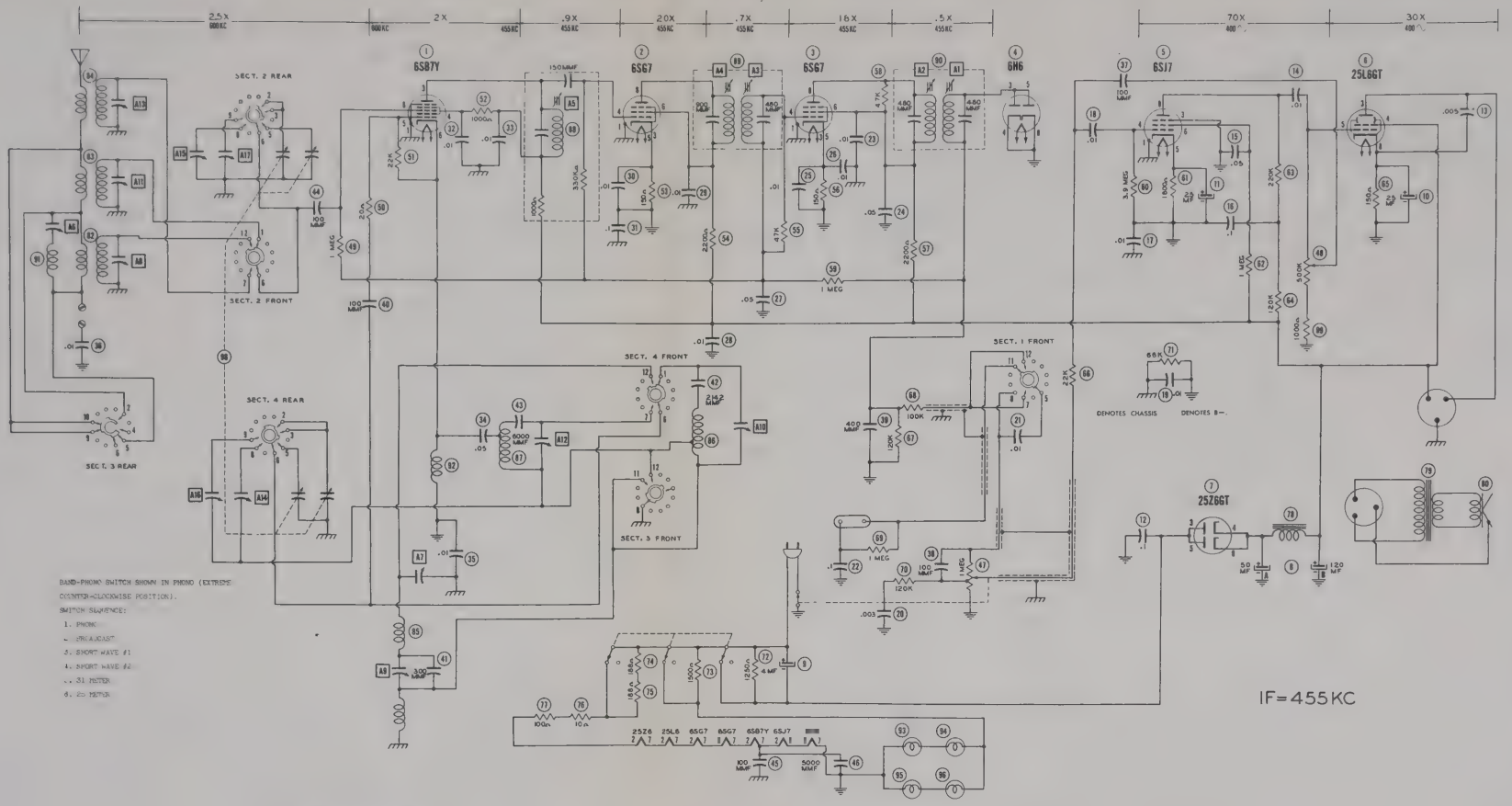
ITEM No.	PART NAME	PILOT PART No.	NOTES
97	Switch		Band
98	2 Gang Var. Cap	26-14	(14-411MMF) each section

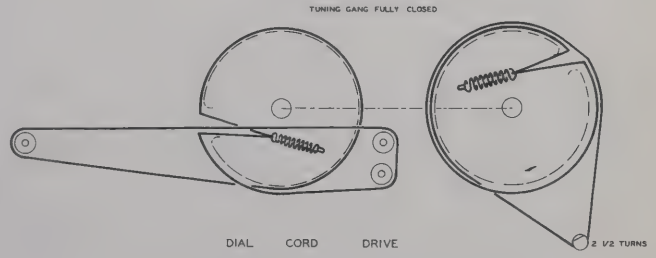


TONE CONTROL DIAL CORD



BAND INDICATOR CORD





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	0V.	10VAC	110VDC	100VDC	-.1VDC‡	0V.	12VAC	-.2VDC
2	6SG7	0V.	2.5VAC	1VDC	-.05VDC	1VDC	105VDC	19VAC	105VDC
3	6SG7	0V.	32VAC	1.2VDC	-.05VDC	1.2VDC	105VDC	25VAC	105VDC
4	6H6	0V.	6VAC	-6VAC	0V.	-.6VDC	0V.	0V.	0V.
5	6SJ7	0V	12VAC	0V.	0V.	.7VDC	20VDC	6VAC	17VDC
6	25L6GT	0V.	5.5VAC	112VDC	120VDC	0V.	0V.	32VAC	8.2VDC
7	25Z6GT	0V.	26VAC	117VAC	130VDC	117VAC	85VDC	55VAC	130VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SB7Y	68KΩ	14Ω	51KΩ	52KΩ	22KΩ	1.8Ω	0Ω	2 Meg.
2	6SG7	64KΩ	16Ω	18KΩ	1.4 Meg.	130Ω	52KΩ	14Ω	52KΩ
3	6SG7	68KΩ	22Ω	15Ω	1.1 Meg.	15Ω	52KΩ	18Ω	52KΩ
4	6H6	68KΩ	5Ω	120KΩ	0Ω	120KΩ	INF.	0Ω	0Ω
5	6SJ7	68KΩ	5Ω	0Ω	4 Meg.	1.1MΩ	1 Meg.	5Ω	390KΩ
6	25L6GT	68KΩ	37Ω	50KΩ	50KΩ	500KΩ	0Ω	22Ω	150Ω
7	25Z6GT	68KΩ	50Ω	0Ω	50KΩ	50Ω	170KΩ	37Ω	50KΩ

‡TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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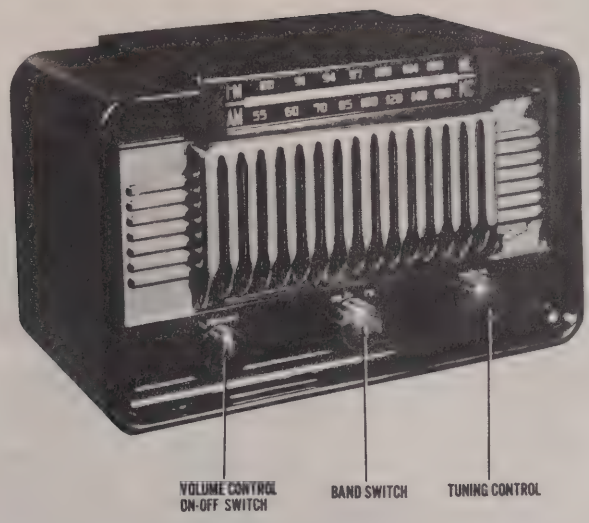
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**



SIGNAL MODEL AF252

TRADE NAME	Signal, Model AF252
MANUFACTURER	Signal Electronics Inc., 114 E. 16th St., New York, N.Y.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14F8 FM Converter, 12SA7GT AM Converter, 12SK7GT IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 21/32" from left edge of dial backplate.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	AM (Counter clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	Direct	High side to ext. ant. lead. Low side to chassis.	1620KC	"	"	"	A5	Adjust for maximum output.
3	Direct	"	1400KC	"	Tune for max. output.	"	A6	" " " " .
4	2 MMFD.	High side to Pin 8 (grid) 14F8. Low side to chassis.	21.75MC (unmodulated)	FM (clock-wise)	Tuning cap. fully open.	"	A7	Adjust for minimum noise.
5	300Ω carbon res.	Remove jumper between center and right hand terminals on loop. High side to center terminal. Low side to left hand terminal.	108MC (no modulation)	"	5-17/32" from left edge of dial backplate.	"	A8	Preset A9 by setting the letters at right angles to frame to which trimmer is attached. Adjust A8 for minimum noise output.
6	"	"	88MC (no modulation)	"	27/32" from left edge of dial backplate.	"	FM Osc. (59)	Adjust FM Osc. coil for minimum noise output. Compress coil slightly to decrease freq., expand coil slightly to increase freq. Repeat Steps 5 & 6 until no further improvement can be made.
7	"	"	103MC (no modulation)	"	Tune for minimum noise.	"	A9	Rock tuning cap. and adjust for minimum noise.

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DATE 3/48-#487-19 SET #37-FOLDER

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SIGNAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM Converter	14F8	14F8	8BW	
2	AM Converter	12SA7GT	12SA7GT	8AD	
3	IF Amp.	12SK7GT	12SK7GT	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SIGNAL PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	80	150	230002		PRSA40302*	EZ555150	DSB-804020-150	Filter - Yl.
B	40	150						" - Blue
C	40	150						" - Blue
D	50	25			PRSA150-40-40		M-40-150	Cathode Bypass-Red
8	10	25	230003	TA-10	PR525-10	BR102A	M-10-25	Stabilizing Cap.
9	.01	400	200001	TC-11	484-01	DT4S1	S-4-01	Line Filter
10	.1	200	190003	TC-1	484-.1	DT2P1	S-2-1	RF Bypass Pwr. Supply
11	.002	600	190007	TC-22	654-002	DT6D2	S-6-002	Output Plate Bypass
12	.02	400	190006	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
13	.02	400	190006	TC-12	484-02	DT4S2	S-4-02	" "
14	.02	400	190006	TC-12	484-02	DT4S2	S-4-02	" "
15	.05	200	190001	TC-15	484-05	DT2S5	S-4-05	AVC Filter
16	.01	400	200001	TC-11	484-01	DT4S1	S-4-01	Conv. Decoupling
17	100	500	220006	1FM-31	1468-0001	5W5T1	MO.5-31	Line Ant. Coupling
18	500	50	220008	1FM-35	1468-0005	5W5T5	MO.5-35	Rectifier Bypass
19	150	500	220012	1FM-315	1468-00015	5W5T15	MO.5-315	AF Plate Bypass
20	150	500	220012	1FM-315	1468-00015	5W5T15	MO.5-315	Diode RF Filter
21	150	500	220012	1FM-315	1468-00015	5W5T15	MO.5-315	" " "
22	100	500	220006	1FM-31	1468-0001	5W5T1	MO.5-31	Filament Bypass
23	1000	300	220009	1FM-21	1468-001	1W5D1	MO.3-21	De-emphasis
24	30	500	220003	MS-43		5R5Q3	MOS.5-43	Regeneration Feedback
25	30	500	220003	MS-43		5R5Q3	MOS.5-43	" "
26	5000	300	210006	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass
27	2500	300	210004	1FM-225	1467-0025	1W5D25	MW.5-225	Quench Network
28	500	500	220008	1FM-35	1468-0005	5W5T5	MO.5-35	RF Bypass
29	500	500	220008	1FM-35	1468-0005	5W5T5	MO.5-35	Osc. Feedback
30	20	500	220002	MS-42	1468-000025	5W5Q2	MO.5-42	Osc. Grid Cap.
31	50	500	220004	MS-45	1469-00005	5R5Q5	MOS.5-45	Fixed Pad
32	2	500	220001					Osc. Coupling
33	2	500	220001					Ant. Coupling
34	500	500	220008	MS-35	1469-0005	5R5T5	MOS.5-35	RF Bypass
62	1000			TC-11	484-01	DT4S1	S-4-01	Ext. Ant. Isolation

*Parallel sections to obtain desired capacity.

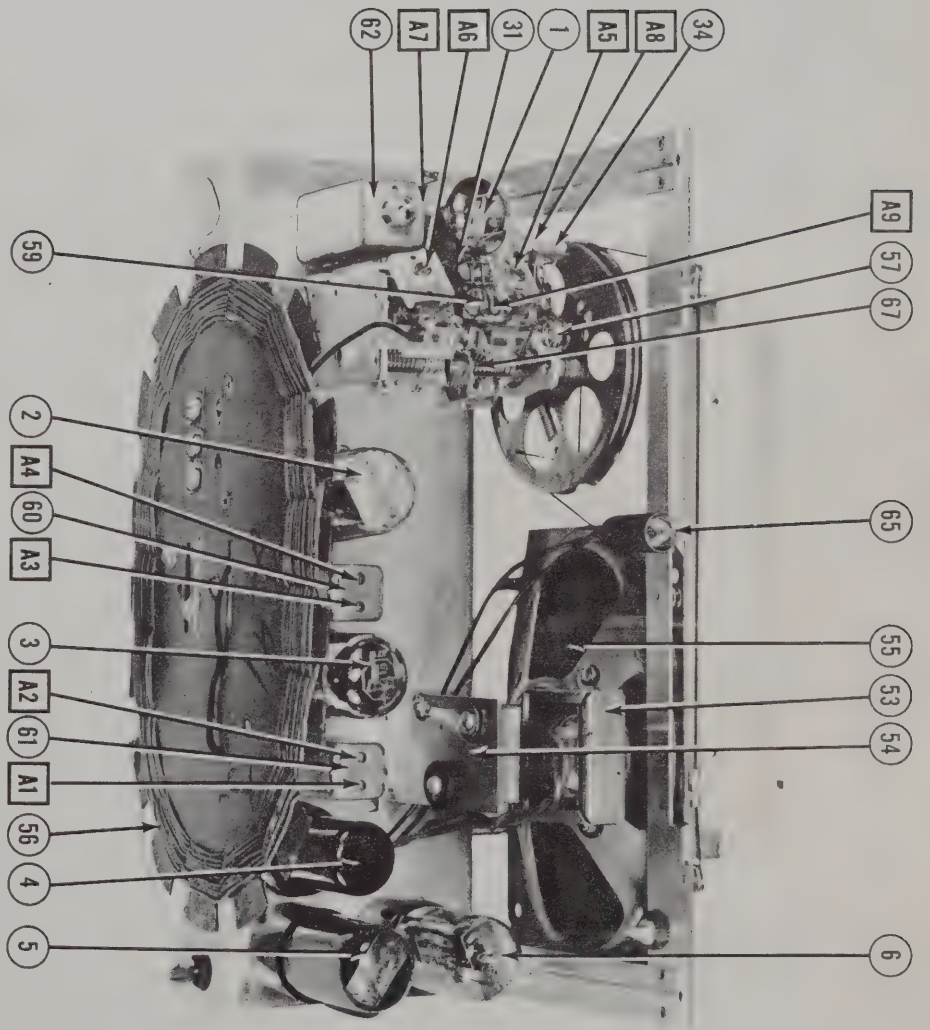
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SIGNAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
35A	500KΩ	2	300003-A	D13-133	AM-60-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 35A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SIGNAL PART No.	IRC PART No.	IDENTIFICATION CODES
36	1500Ω	½	272152	BTS-1500	Br.-Grn.-Red Quench Network
37	24KΩ	½		BTS-22K	Red-Yl.-Or. FM Oscillator Grid
38	100Ω	½	272101	BW-½-100	Br.-Blk.-Br. FM Oscillator Plate Decoupling
39	24KΩ	½		BTS-22K	Red-Yl.-Or. Converter Cathode
40	100KΩ	½	272104	BTS-100K	Br.-Blk.-Yl. Voltage Dropping
41	160KΩ	½		BTS-150K	Br.-Blue-Yl. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SIGNAL PART No.	IRC PART No.	
42	1000Ω	½	272102	BTS-1000	Br.-Blk.-Red Decoupling
43	15KΩ	½		BTS-15K	Br.-Blue-Or. FM IF Transformer Shunt
44	22KΩ	½		BTS-22K	Red-Yl.-Or. Oscillator Grid
45	2.2 Meg.	½	272223	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
46	470Ω	½	272471	BTS-470	Yl.-Vi.-Br. Converter Decoupling
47	47KΩ	½		BTS-47K	Grn.-Br.-Or. Diode RF Filter
48	4.7 Meg.	½	272475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
49	220KΩ	½	272224	BTS-220K	Red-Red-Yl. AF Plate Load
50	470KΩ	½	272474	BTS-470K	Yl.-Or.-Yl. Output Grid
51	150Ω	½	272151	BW-½-150	Br.-Grn.-Br. Output Cathode
52	1200Ω	1	283122	BTA-1200	Br.-Red-Red Filter

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SIGNAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
53	2200Ω	3.1Ω	175Ω	.6Ω	Part of 185003	A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SIGNAL PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
54	PM	3.1Ω	185003		46A07†	†Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
55	4"x6"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SIGNAL PART No.	MEISSNER PART No.	
56	Loop Ant.	0Ω	.8Ω	247003		
57	FM RF Coil		0Ω	245004		
58	BC Osc. Coil	.8Ω	5.6Ω	248005	14-1060§	§Add 50MMFD from osc. grid to high side tuning cap.
59	FM " "		0Ω	245004		
60	Input IF	14Ω	13.1Ω	305002	16-6668	
61	Output IF	16.8Ω	23Ω	305003	16-6669	
62	FM IF Trans.	.3Ω	2.7Ω	250001		
63A	RF Line Chk.		.1Ω	250002		
B	" " "		.1Ω			
64	RF Choke		1.2Ω	250003		

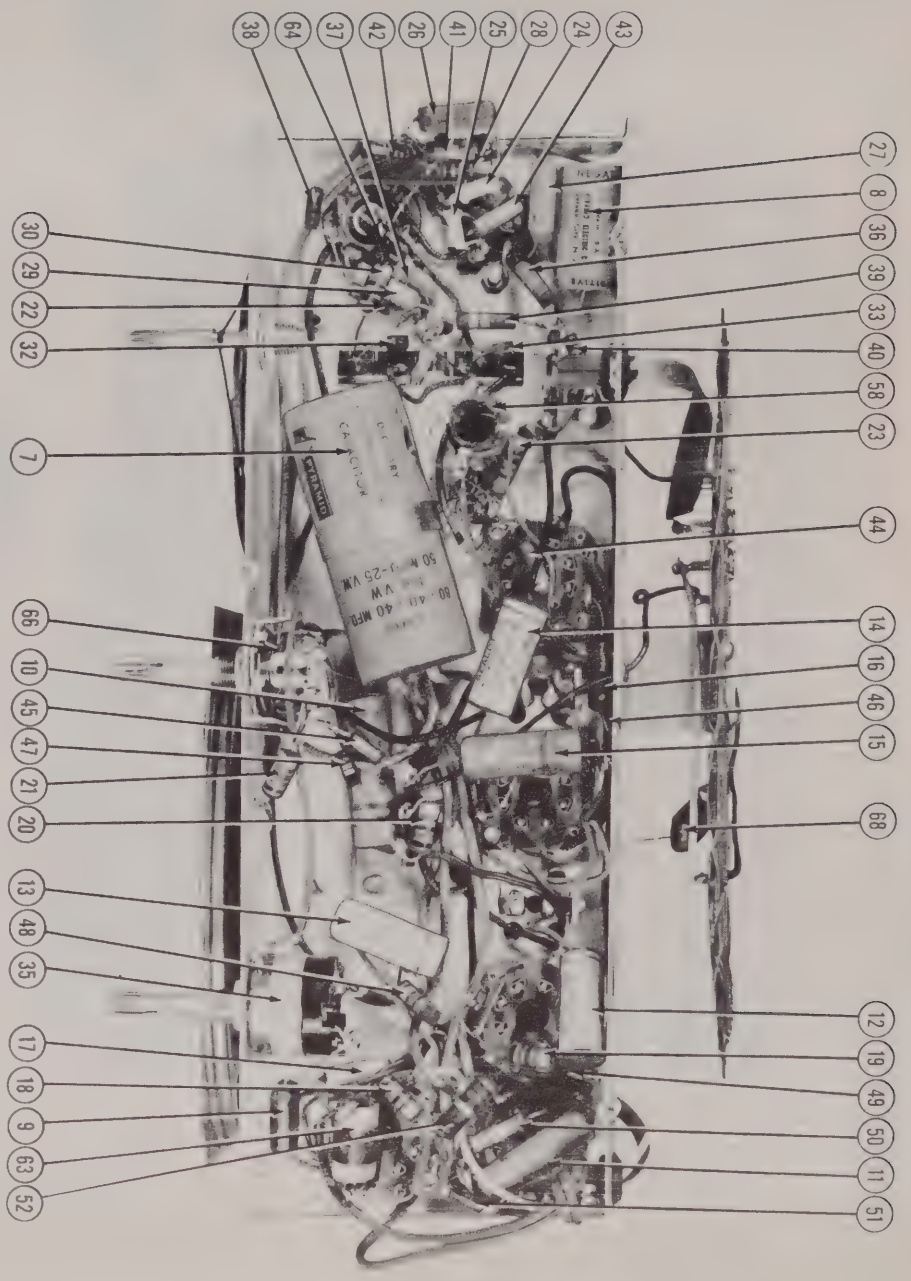
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SIGNAL PART No.		
65	Bayonet	6-8	0.15	Brown	316001		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	SIGNAL PART No.	NOTES
66	Switch	255002	Band
67	2 Gang Var. Cap.	235002	AM (35-547MMF, 35-210MMF)
A8	Trimmer	235006	FM Ant. Adj.
	Dial Scale	340008	
	Dial Pointer	346004	

CHASSIS—BOTTOM VIEW



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	14F8	-1.7VDC§	13VAC	107VDC	0V	60VDC	105VDC	0V	28VDC
	2	12SA7GT	0V	39VAC	85VDC	85VDC	-10VDC§	0V	26VAC	-.8VDC
	3	12SK7GT	0V	50VAC	0V	-.8VDC	0V	90VDC	39VAC	90VDC
	4	12SQ7	0V	-1VDC	0V	-.9VDC	-.7VDC	55VDC	26VAC	13VAC
	5	35L6GT	0V	85VAC	117VDC	90VDC	0V	0V	50VAC	5.2VDC
	6	35Z5GT	117VAC	117VAC	112VAC	0V	112VAC	0V	85VAC	124VDC

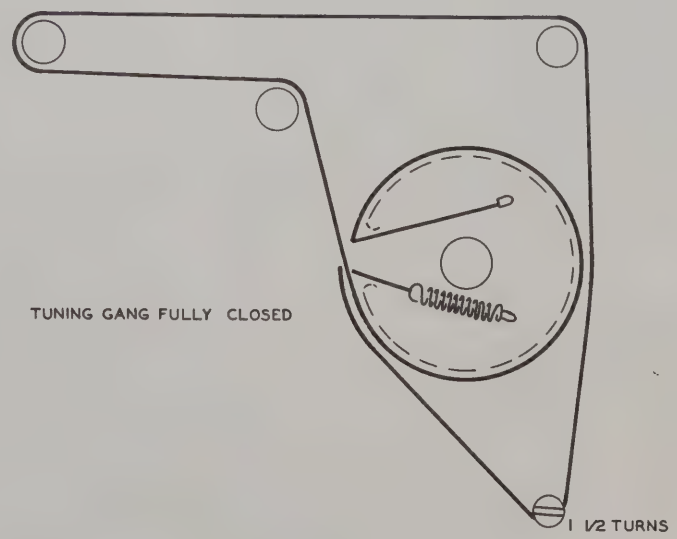
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

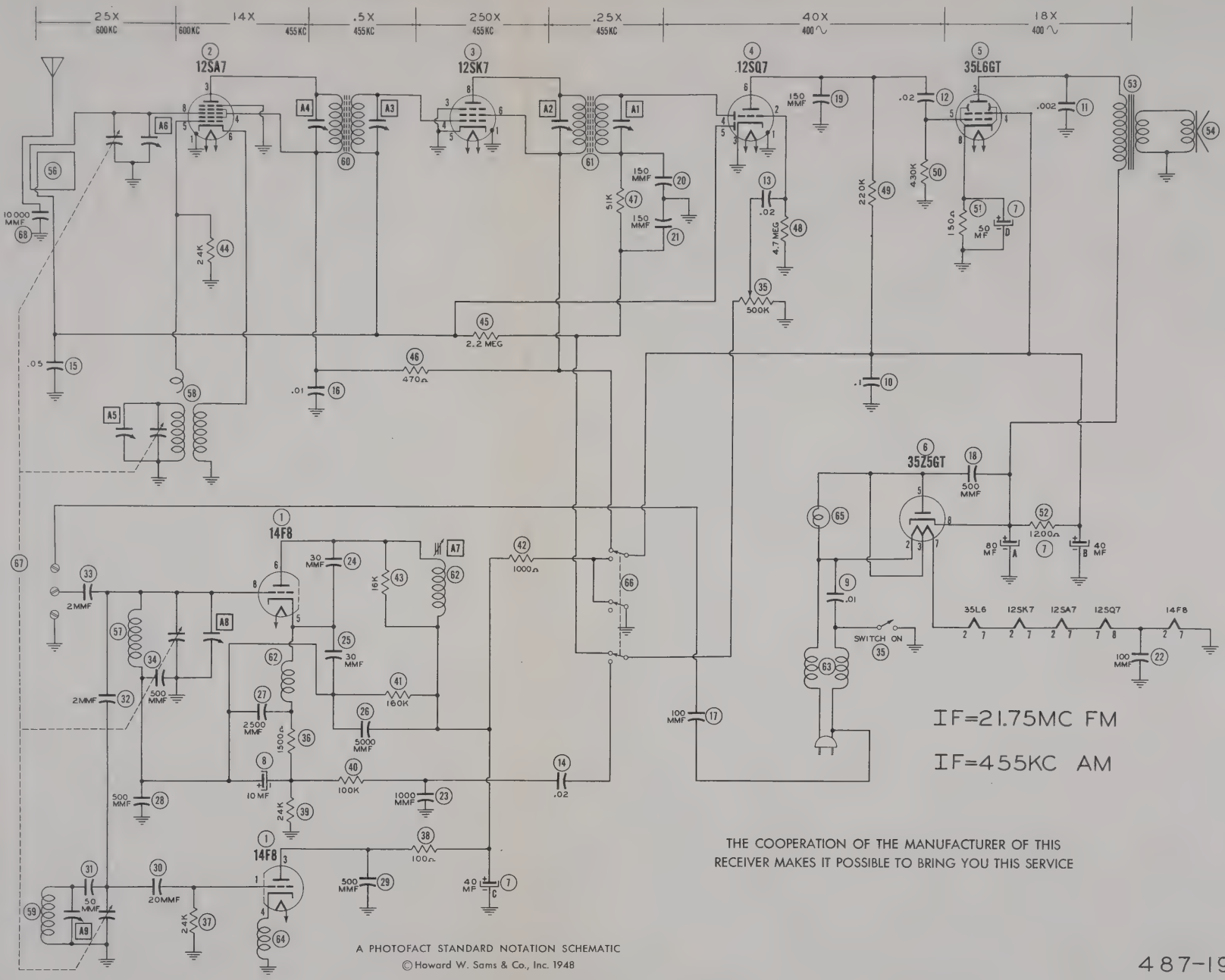
	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	14F8	24KΩ	12Ω	100KΩ	1.2Ω	23KΩ	100KΩ	0Ω	250KΩ
	2	12SA7GT	0Ω	36Ω	100KΩ	100KΩ	22KΩ	.8Ω	24Ω	2.6 MEG
	3	12SA7GT	0Ω	50Ω	0Ω	2.6 MEG	0Ω	100KΩ	36Ω	100KΩ
	4	12SQ7G	0Ω	4.7 MEG	0Ω	2.6 MEG	550KΩ	320KΩ	24Ω	12Ω
	5	35L6GT	0Ω	85Ω	100KΩ	100KΩ	430KΩ	INF.	50Ω	140Ω
	6	35Z5GT	115Ω	115Ω	112Ω	0Ω	112Ω	INF.	85Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DIAL CORD DRIVE



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SONORA MODEL WDU-249
BATTERY-LINE OPERATED

SONORA MODEL WDU-249
BATTERY-LINE OPERATED

SONORA MODEL WDU-249

TRADE NAME	Sonora, Model WDU-249
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY	110-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	.14 Amp. @ 117 Volts AC or 51MA @ 9 Volts DC and 10.7MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF to reduce hum modulation.
2		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SONORA PART No.	STANDARD REPLACEMENT		
1	Converter	IR5	IR5	7AT	
2	IF Amp.	IU4	IU4	6AR	
3	Det.-AVC-AF	IS5	IS5	6AU	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SONORA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
5A	30	150	N-6006	TEL-434*	TAF886D4A	UP7DJ63	DY-419*	◘ Filter
B	30	150						◓ Filter
C	100	25						▲ Filament Bypass
D	100	25		UHC-102	PRS25-100		M-100-25	Filament Bypass
6	.05	400	N-1346	TC-15	484-05	DT4S5	ST-4-05	Line Filter
7	.02	400	N-1376	TC-12	484-02	DT4S2	ST-4-02	Hum Neutralization
8	.005	600	N-4894	TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
9	.005	600	N-4894	TC-25	684-005	DT6D5	ST-6-005	Audio Coupling
10	.05	200	N-1345	TC-15	484-05	DT2S5	ST-4-05	AF Screen Bypass
11	.005	600	N-4894	TC-25	684-005	DT6D5	ST-6-005	Audio Coupling
12	.01	400	N-1344	TC-11	484-01	DT4S1	ST-4-01	IF Grid Filter
13	.08	200	N-4957	TC-1	484-.1	DT2P1	ST-2-1	Line Isolation
14	.1	200	N-1351	TC-1	484-.1	DT2P1	ST-2-1	Filament Bypass
15	.05	200	N-1345	TC-15	484-05	DT2S5	ST-4-05	Conv. Screen Decoup.
16	.05	200	N-1345	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
17	100	500	N-6015	1FM-31	1468-0001	5W5T1	MO.5-31	AF Plate Bypass - Cer.
18	100	500	N-6015	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter - Cer.
19	7	500	N-6054					Feedback - Cer.

* Parallel Sections to Obtain Desired Capacity

CONTROLS

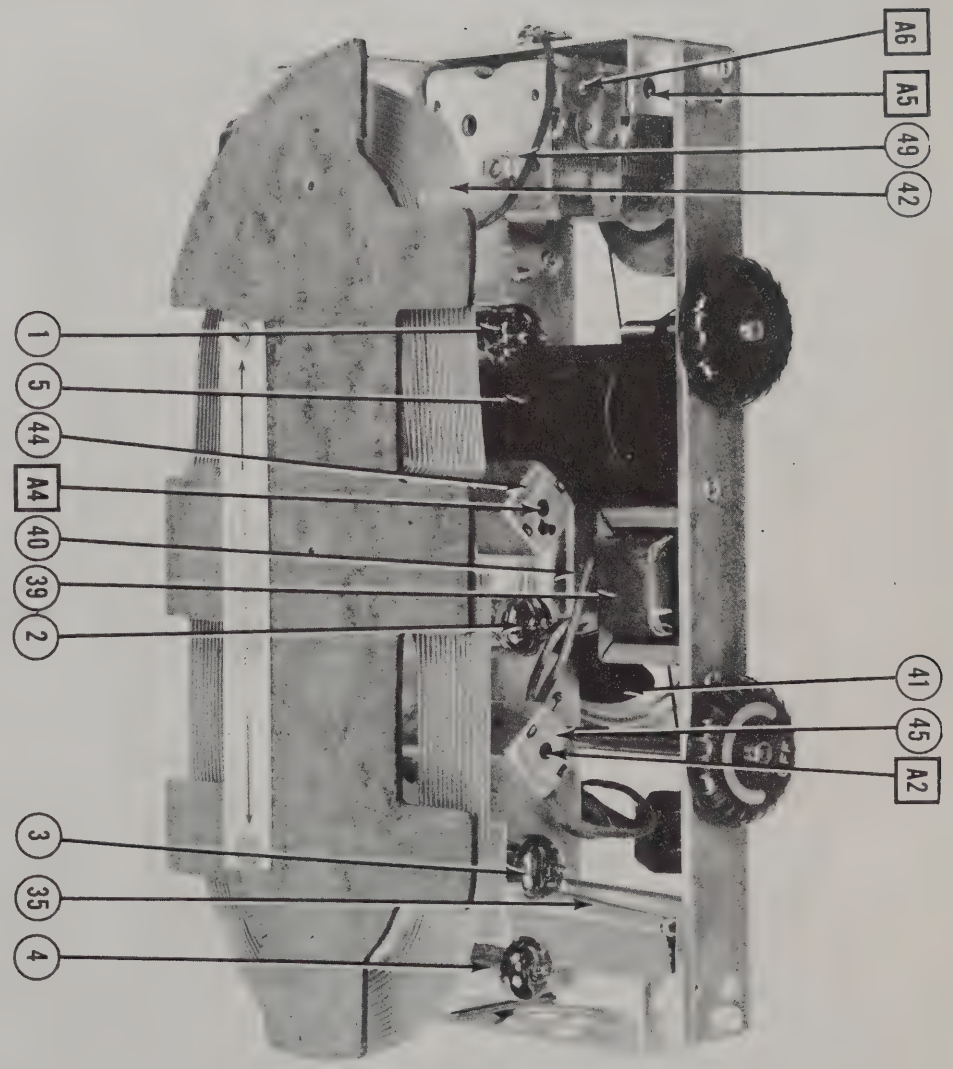
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	
20A	1 Meg.	1/2	N-6007	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	A	FS-3	Attach to 20A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	
21	100KΩ	1/2	N-2973	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
22	22KΩ	1/2	N-6012	BTS-22K	Red-Red-Yl. Converter Screen Dropping
23	4.7 Meg.	1/2	N-4061	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
24	6.8 Meg.	1/2	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. IF Grid
25	180Ω	1/2	N-4067	BW-1/2-180	Br.-Gray-Br. Filament String
26	47KΩ	1/2	N-4063	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
27	6.8 Meg.	1/2	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
28	3.9 Meg.	1/2	N-5473	BTS-3.9 Meg.	Or.-White-Grn. AF Screen Dropping
29	1 Meg.	1/2	N-2976	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
30	2.2 Meg.	1/2	N-4277	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
31	390Ω	1/2	N-5159	BW-1/2-390	Or.-White-Br. Filament String
32	10Ω	1/2	N-6009	BW-1/2-10	Br.-Blk.-Br. " "
33	240Ω	1/2	N-6052	BW-1/2-220	Red-Yl.-Br. " "
34	12 Meg.	1/2	N-6053	BTS-12 Meg.	Br.-Red-Blue Hum Neutralization
35	2400Ω	5.5	N-6008	ABA-2500	Filament Dropping-See Note
36	2200Ω	1/2	N-4896	BTS-2200	Red-Red-Red Filter
37	68Ω	1.5	N-6113	BW-2-68	Surge Limiter
38	16Ω	1/2	N-6010	BW-1/2-18	Br.-Gray-Blk. Filament Dropping

Note: On IRC Replacement Set Slider @ 2400Ω from one end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SONORA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
39	9000Ω	3.1Ω	470Ω	.4Ω	N-6004	A-3879	T22847	A-2932	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SONORA PART No.	JENSEN PART No.	QUAM PART No.	
40	FIELD PM	VC IMP. 3.1Ω	N-5888	ST-113† Mod. P4-X	4A1†	†Fabricate new mounting bracket.
41	CONE DIA. 4"	VC DIA. 1/2"				

R F COILS

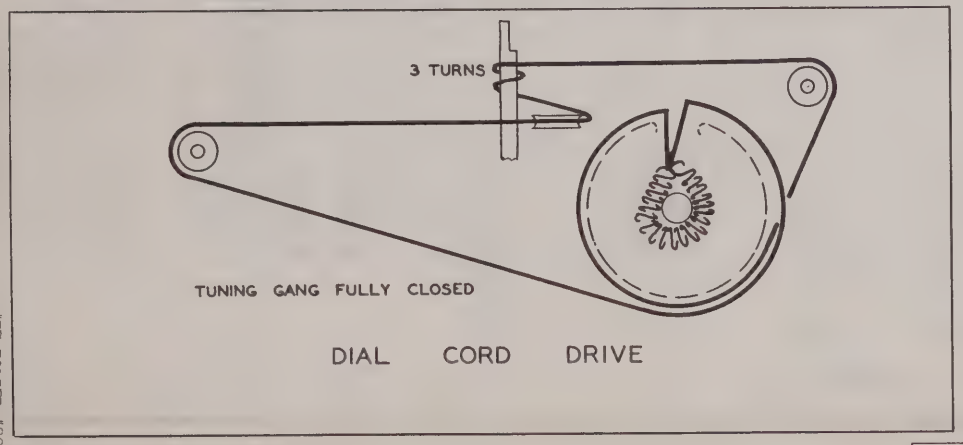
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	
42	Loop Ant.		1.6Ω	N-5872		
43	Osc. Coil	2.5Ω	7Ω	N-6003	14-1040‡	‡Add 50MMFD from oscillator grid to high side of tuning capacitor.
44	Input IF	22Ω	22Ω	N-5973	16-6678	
45	Output IF	22Ω	22Ω	N-5973	16-6678	

BATTERIES

ITEM No.	VOLTAGE	SONORA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
46	9V "A" 90V "B"				#753			#F6A60	

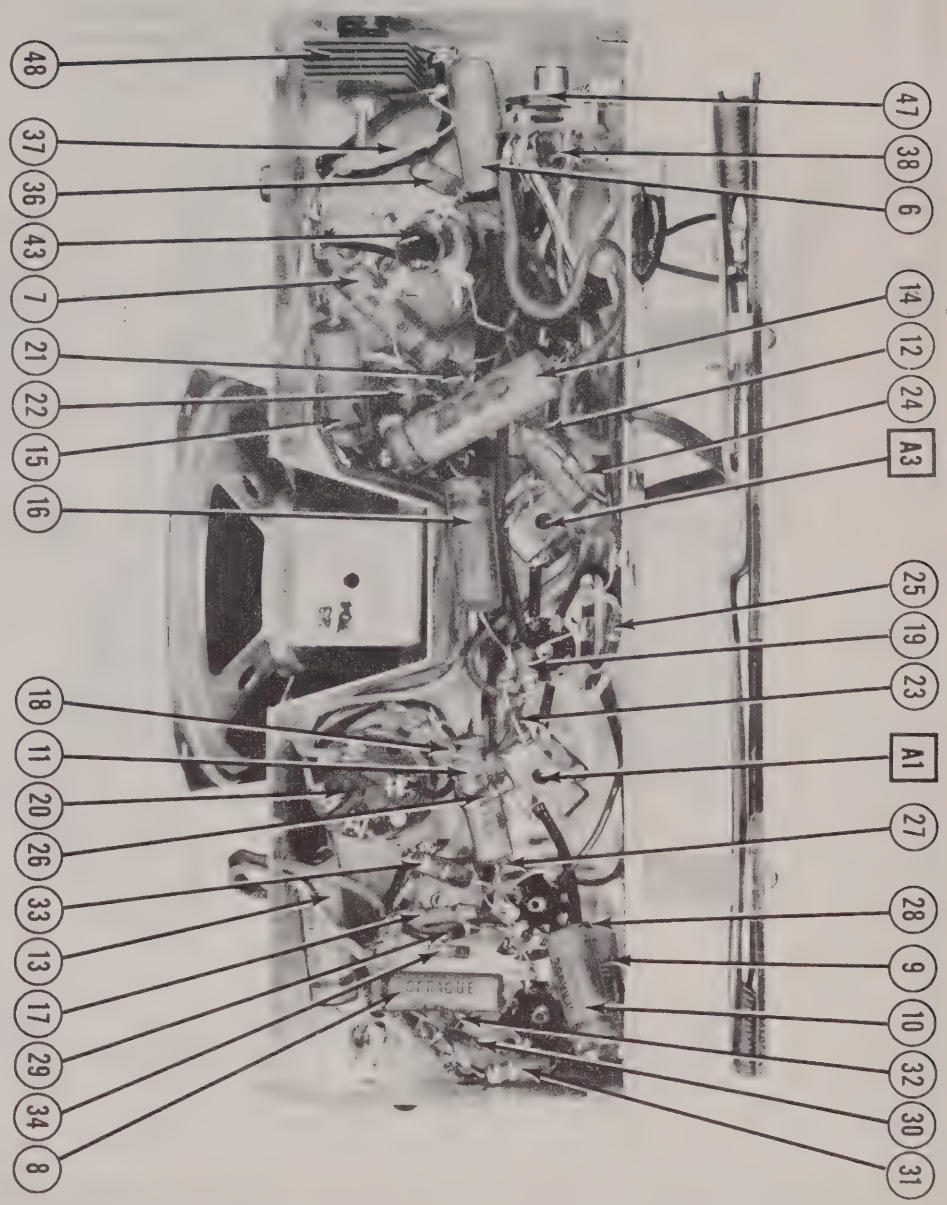
MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
47	Switch		AC-DC-Batt.
48	Rectifier	N-5885	Selenium
49	2 Gang Var.Cap.	N-5936	(35-194MMF, 27-372 MMF)

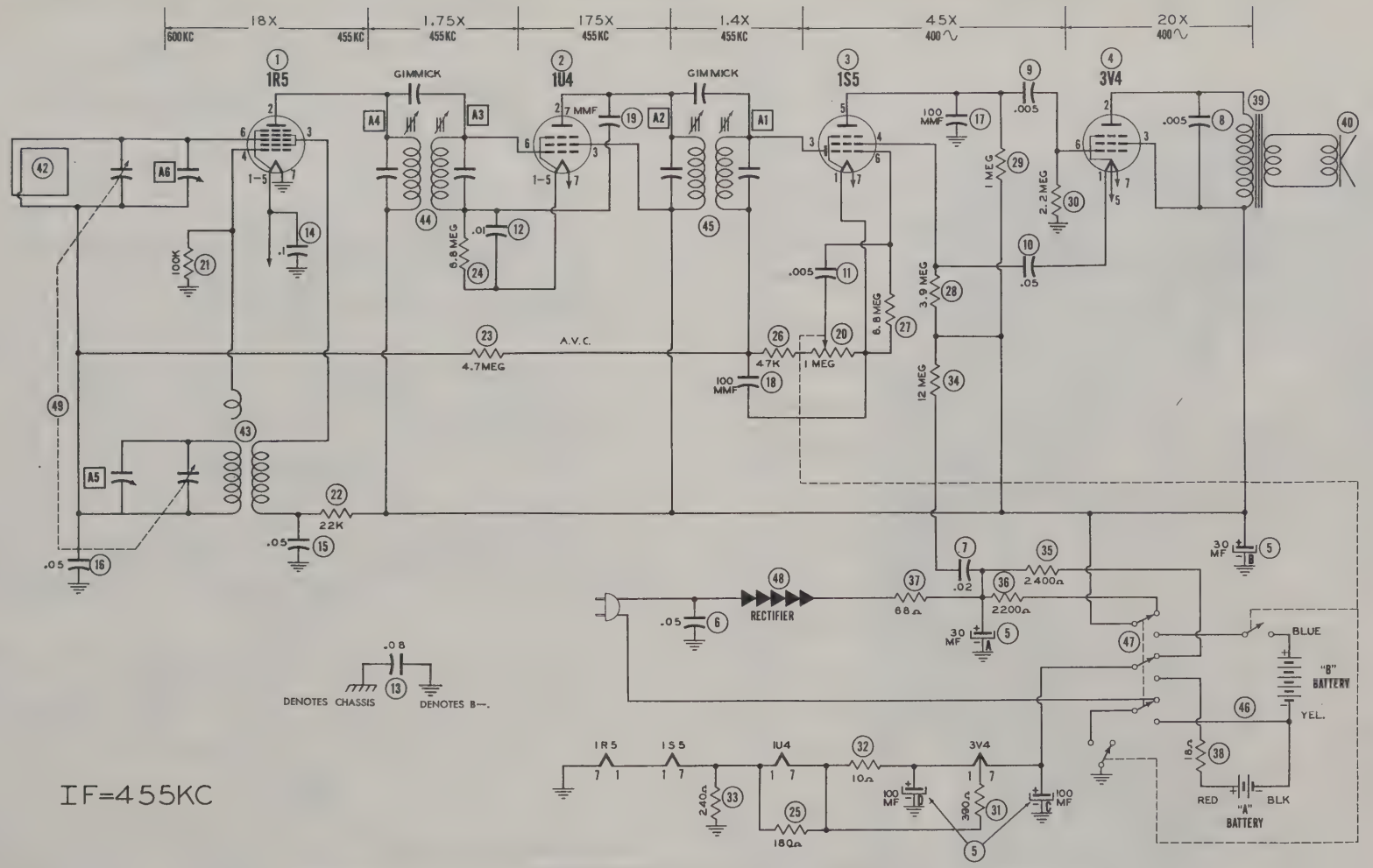


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



SONORA MODEL WDU-249



IF=455KC

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.3VDC	92VDC	46VDC	-10VDC§	1.3VDC	0V	0V
2	1U4	2.5VDC	92VDC	0V	0V	2.5VDC	0V	4VDC
3	1S5	1.3VDC	0V	0V	15VDC	16VDC	0V	2.5VDC
4	3V4	4.6VDC	89VDC	92VDC	0V	5.9VDC	0V	7.2VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	4KΩ	25KΩ	100KΩ	*	5 MEG	*
2	1U4	*	4KΩ	4KΩ	5 MEG	*	7 MEG	*
3	1S5	*	INF.	1 MEG	4 MEG	1 MEG	6.8 MEG	*
4	3V4	*	4.5KΩ	4KΩ	INF.	*	2.2 MEG	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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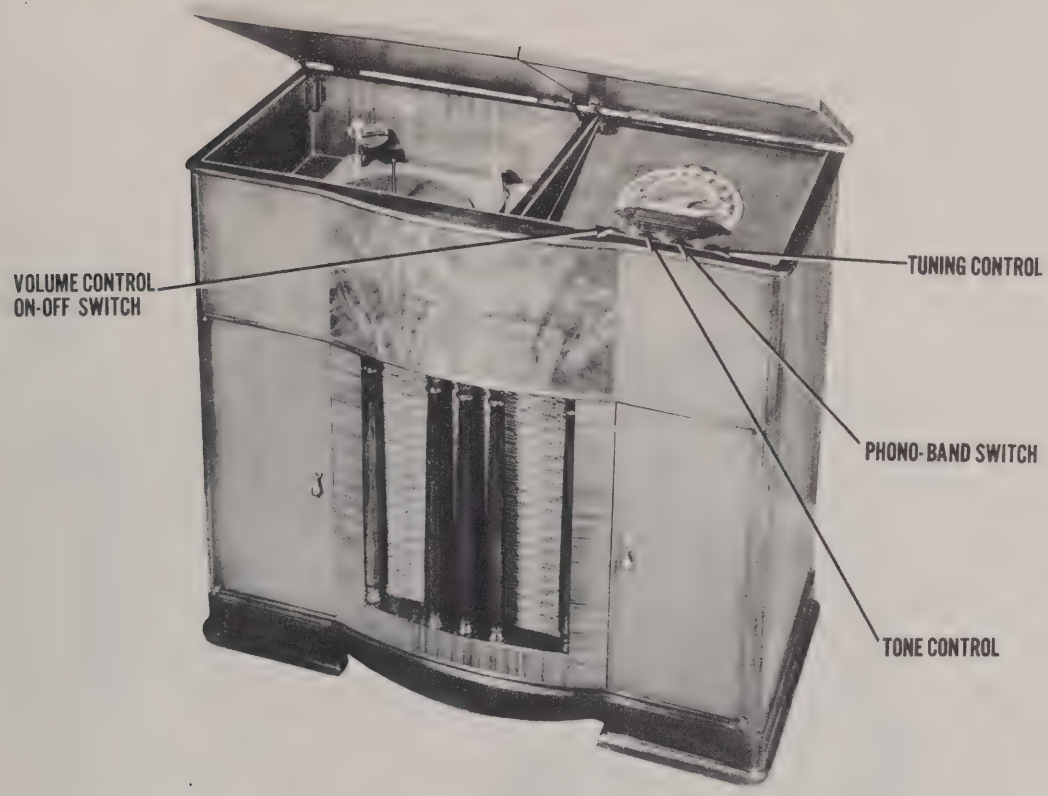
487-20

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to pin #1 of 1S5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

SONORA MODEL
WLRU-219A



SONORA MODEL WLRU-219A

TRADE NAME	Sonora, Model WLRU-219A
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (NINE)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6BA6 IF Driver, 6AL5 Ratio Detector, 6SQ7 AM Det.-AVC-AF, 6SQ7 Phase Inv., (2) 25L6GT Power Output.
POWER SUPPLY	110-120 Volts AC — RATING .55 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC — FREQ. MOD. 87-109MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 7 (grid) 6BE6. Low side to B-.	455KC	Center Position	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation. Always use peak obtained when slug is turned out the greatest distance.
2	100MMFD	High side to ext. ant. lead. Low side to B-.	1620KC	"	"	"	A5	Adjust for maximum output
3	100MMFD	"	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output. Check calibration and sensitivity at 600KC.

FOR FM ALIGNMENT SEE LAST PAGE OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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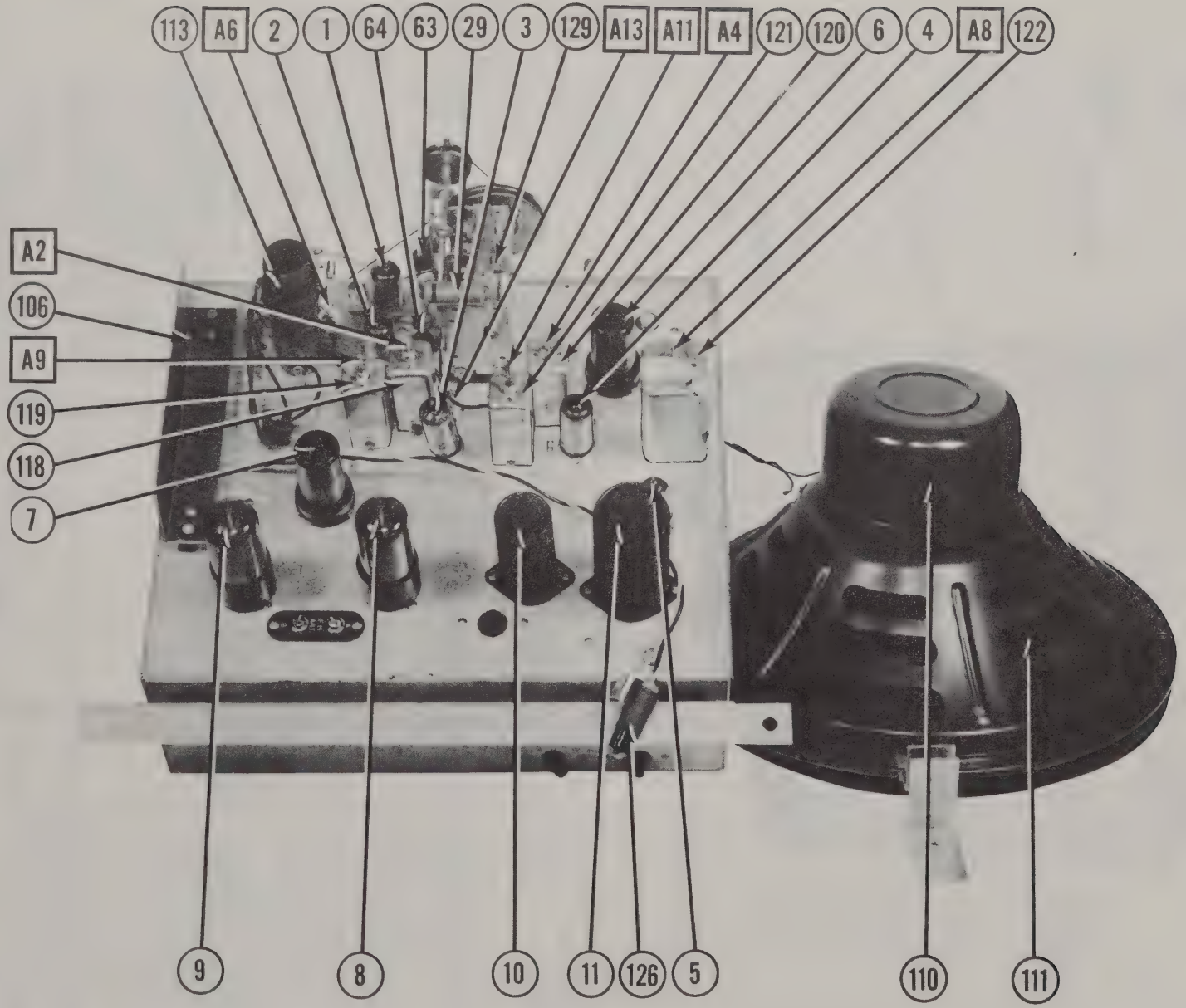
SONORA MODEL
WLRU-219A PAGE 1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A4
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A2
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A9
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A7
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	IF Driver	6BA6	6BA6	7BK	
5	Ratio detector	6AL5	6AL5	6BT	
6	AM DET-AVC-AF	6SQ7	6SQ7	8Q	
7	Phase Inv.	6SQ7	6SQ7	8Q	
8	Power Output	25L6GT	25L6GT	7AC	
9	Power Output	25L6GT	25L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
10	80	150	N-6312	EL-35§	AF88D§	UP-8015	DY-80-150	Filter
11A	60	150	N-6523	EL-452	AF101010 -	UP-	DH-2X50-150	▰Filter
B	60	150			D4A*	555150*	M-50-150	▣Filter
C	60	150						▲Filter
12	6	150	N-6374	UT-41	PRS150-4	BR415	M-8-150	Ratio Det. Bias
13	.05	400	N-1345	TC-15	484-05	DT4S5	MPH-4-05	Line Filter
14	.01	600	N-1478	TC-11	684-01	DT6S1	S-6-01	Tone Compensation
15	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
16	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
17	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Audio Coupling
18	.005	600	N-4894	TC-25	684-005	DT6D5	S-6-005	Audio Coupling
19	.1	200	N-1351	TC-1	484 -.1	DT4P1	S-2-1	RF Bypass PWR Supply
20	.1	200	N-1351	TC-1	484 -.1	DT4P1	S-2-1	AF Plate Decoupling
21	.005	600	N-4894	TC-25	684-005	DT6D5	S-6-005	Tone Compensation
22	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	Tone Compensation
23	.002	600	N-6377	TC-12	684-002	DT6D2	S-6-002	De-emphasis
24	.02	400	N-1376	TC-12	484-02	DT4S2	S-4-02	Audio Coupling
25	.05	200	N-1345	TC-15	484-05	DT4S5	S-4-05	AVC Filter
26	.1	200	N-1351	TC-1	484-.1	DT4P1	S-2-1	Line Isolation
27	.05	200	N-1345	TC-15	484-05	DT4S5	S-4-05	AVC Filter
28	.01	400	N-1344	TC-11	484-01	DT4S1	S-4-01	RF Bypass
29	.05	400	N-1345	TC-15	484-05	DT4S5	S-4-05	Tuning Gang Isolation
30	.08	200	N-4957	TC-1	484-.1	DT4P1	S-2-1	Phono Isolation
31	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass
32	10000		N-6482	1FM-11	1467-01	1D3S1	MW.3-11	RF Bypass
33	250	500	N-6488	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
34	250	500	N-6488	1FM-325	1468-00025	5W5T25	MO.5-325	RF Bypass
35	250	500	N-6488	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Load Cap.
36	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Filament Bypass
37	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Driver IF Decoupling
38	130	500	N-6487	1FM-315	1468-00015	5W5T15	MO.5-315	Diode Load Cap.
39	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Driver Cathode Bypass
40	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	AVC Filter
41	50	500	N-6375	1FM-45	1468-00005	5W5Q5	MO.5-45	Diode RF Filter
42	50	500	N-6375	1FM-45	1468-00005	5W5Q5	MO.5-45	Diode RF Filter
43	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	IF Screen Bypass
44	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	IF Cathode Bypass
45	10000		N-6482	1FM-11	1467-01	1D3S1	MW.3-11	RF Bypass
46	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	AVC Filter
47	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Conv. Plate Decoup.
48	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Conv. Screen Bypass
49	4.5	500	N-6483	MS-55	1468-000005	5W5V5	MO.5-55	Feedback
50	50	500	N-6375	1FM-45	1468-00005	5W5Q5	MO.5-45	OSC Grid Cap
51	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass Pwr. Supply
52	100	500	N-6015	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling
53	50	500	N-6375	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling
54	75	500	N-6484	1FM-475	1468-000075			Fixed Pad
55	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Screen Bypass
56	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Cathode Bypass
57	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	AVC Filter
58	250	500	N-6488	1FM-325	1468-00025	5W5T25	MO.5-325	RF Bypass
59	250	500	N-6488	1FM-325	1468-00025	5W5T25	MO.5-325	Filament Bypass
60	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Filament Bypass

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
109	4100Ω CT	3.9Ω	260Ω CT	.4Ω	N-5588	A-3870	T22S60	A-2901#	#Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.	N-6517	ST-127†	12A6†	† Replace output transformer to match 6-8Ω Voice Coil.
110	PM	3.9Ω		Mod. P12-SH		
	Cone Dia.	V.C.Dia.				
111	11½ In.	1 In.				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: MEISSNER PART No.
112	Loop Ant		.5Ω		
113	AM Ant Coil	.1Ω	2.9Ω	N-6572	
114	FM Ant Coil	0Ω	0Ω	N-6371	
115	FM RF Coil		0Ω	N-6372	
116	AM OSC Coil	2Ω	5Ω	N-6348	14-1040
117	FM OSC Coil		0Ω	N-6349	
118	Input IF AM	10Ω	10.5Ω	N-6344	16-6668
119	Input IF FM	1.5Ω	.1Ω	N-6346	
120	Output IF AM	10.5Ω	10.5Ω	N-6345	16-6669
121	Output IF FM	1.5Ω	.1Ω	N-6346	
122	Dis. Trans.	2.5Ω	.1Ω	N-6341	
123	Plate Choke		3.5Ω	N-6373	
124	Fil. Choke	.5Ω	.5Ω	N-6389	
125	RF Choke		0Ω		
132	RF Choke		0Ω		
133	Fil. Choke		0Ω		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
126	Bayonet	6-8V	0.15A	Brown	N-1147		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
127	Switch	N-6518	Band-Phono
128	Rectifier	N-6519	Selenium
129	2 Gang Var. Cap	N-6276	AM (12-528 MMF, 10-185MMF)
A5	Trimmer	N-6407	BC OSC. ADJ.
A6	Trimmer	N-6406	BC ANT. ADJ.
A13	Trimmer	N-6420	FM OSC. ADJ.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SONORA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
61	13	500	N-6622					Fixed Trimmer ‡
62	20	500	N-6584	MS-42		5W5Q2	MO.5-42	Fixed Trimmer ‡
63	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass
64	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass
65	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	RF Bypass
66	150	500	N-2333	1FM-315	1468-00015	5W5T15	MO.5-315	Phono Tone Comp.
130	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Filament Bypass
131	5000		N-6272	1FM-25	1467-005	1D5D5	MW.5-25	Filament Bypass‡

* Do not use bypass section.
‡ Not used in some models.
§ Parallel Sections to obtain desired capacity.

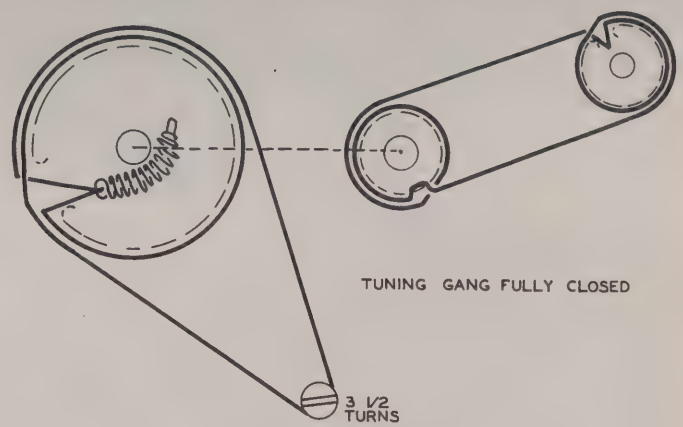
CONTROLS

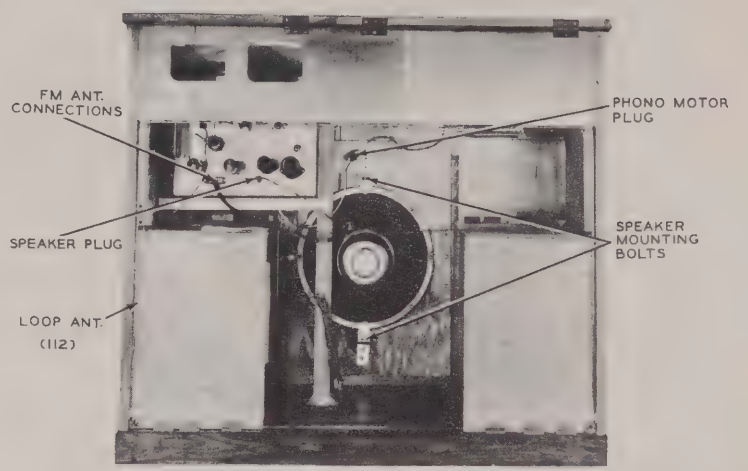
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	
67A	500KΩ	½	N-5651	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 67A per instructions.
C	Switch		Not Req.	41	SW-A	Attach to 67A per instructions.
68	500KΩ	½	N-5578			Tone Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES	
	RESISTANCE	WATTS	SONORA PART No.	IRC PART No.		
69	1 Meg	½	N-1262	BTS-1 Meg	Br.-Blk.-Grn.	AVC Network
70	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl.	AVC Network
71	2.2 Meg	½	N-4277	BTS-2.2 Meg	Red-Red-Grn.	R. F. Grid
72	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk.	R. F. Cathode
73	2200Ω	½	N-4896	BTS-2200	Red-Red-Red	R. F. Screen Dropping
74	820Ω	½	N-4279	BTS-820	Gray-Red-Br.	R. F. Plate Load
75	10KΩ	½	N-4895	BTS-10K	Br.-Blk.-Yl.	Converter Grid
76	22KΩ	½	N-4025	BTS-22K	Red-Red-Or.	Oscillator Grid
77	1000Ω	½	N-1694	BTS-1000	Br.-Blk.-Red	Converter Screen Dropping
78	1000Ω	½	N-1694	BTS-1000	Br.-Blk.-Red	Converter Plate Decoupling
79	12Ω	½	N-5053	BW-½-12	Br.- Red-Blk.	Parasitic Suppressor
80	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk.	1st I. F. Cathode
81	470Ω	½	N-6011	BTS-470	Yl.-Vi.-Br.	1st I. F. Decoupling
82	47KΩ	½	N-4063	BTS-47K	Yl.-Vi.-Or.	Diode R. F. Filter
83	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl.	AVC Network
84	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk.	2nd I. F. Cathode
85	470Ω	½	N-6011	BTS-470	Yl.-Vi.-Br.	2nd I. F. Decoupling
86	68Ω	½	N-6485	BW-½-68	Blue-Gray-Blk.	Balancing Resistor
87	33KΩ	½	N-4064	BTS-33K	Or.-Or.-Or.	De-emphasis
88	100KΩ	½	N-2973	BTS-100K	Br.-Blk.-Yl.	AVC Network
89	33KΩ	½	N-6376	BTS-33K	Or.-Or.-Or.	Ratio Detector Diode Load
90	27KΩ	½	N-4451	BTS-27K	Red-Vi.-Or.	Tone Compensation
91	6.8 Meg	½	N-4028	BTS-6.8 Meg	Blue-Gray-Grn.	AF Grid
92	1.8 Meg	½	N-6486	BTS-1.8 Meg	Br.-Gray-Grn.	AVC Network
93	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl.	AF Plate Load
94	68KΩ	½	N-5693	BTS-68K	Blue-Gray-Or.	Decoupling
95	6.8 Meg	½	N-4028	BTS-6.8 Meg	Blue-Gray-Grn.	Phase Inverter Grid
96	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl.	Phase Inverter Plate Load
97	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl.	Output Grid
98	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl.	Output Grid
99	12KΩ	½	N-5690	BTS-12K	Br.-Red-Or.	Output Grid
100	100Ω	1	N-1692	BW-1-100	Br.-Blk.-Br.	Output Cathode
101	1 Meg	½	N-1262	BTS-1 Meg	Br.-Blk.-Grn.	Series Phono
102	33Ω	1.5	N-6515	BW-2-33		Surge Limiter
103	33Ω	1.5	N-6515	BW-2-33		Surge Limiter
104	220Ω	1	N-6514	BW-1-220	Red-Red-Br.	Filter
105	220Ω	1	N-6514	BW-1-220	Red-Red-Br.	Filter
106A	30Ω	3	N-6516	ABA-150		Line Dropping - See Note 1
B	120Ω	4.5				Line Dropping
107	*Special		N-6311			Regulating Resistor
108	Special		N-6311			Regulating Resistor

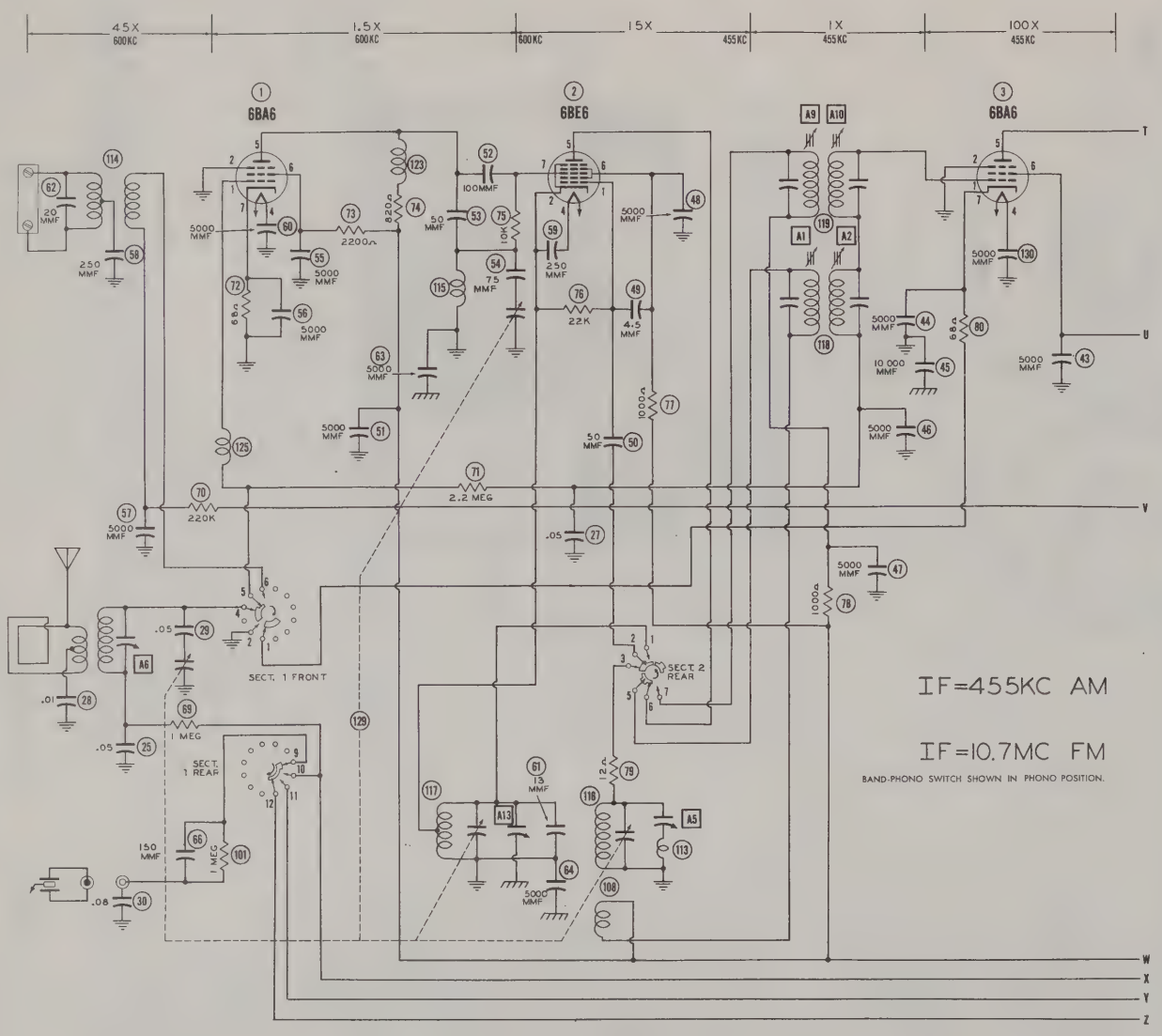
Note 1: On IRC Replacement Set Slider @ 30Ω from one end.





DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove four Phillips head screws holding dial glass to cabinet. Remove dial glass from cabinet.
3. Remove dial pointer from chassis.
4. Remove speaker plug from chassis.
5. Disconnect phono-motor plug.
6. Remove phono-pickup plug from chassis.
7. Remove plug from loop antenna.
8. Remove FM antenna leads from chassis.
9. Remove two hex head bolts holding chassis in cabinet. Remove chassis from cabinet.
10. Remove four Phillips head screws holding speaker in cabinet. Remove speaker from cabinet.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

Item	Tube	VOLTAGE READINGS Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-1VDC	0V	25.5VAC	32VAC	100VDC	100VDC	1VDC	--
2	6BE6	-16VDC§	0V	18.5VAC	25VAC	110VDC	102VDC	0V	—
3	6BA6	0V	0V	32VAC	38.5VAC	103VDC	103VDC	.8VDC	—
‡ 4	6BA6	.01VDC	0V	45VAC	38.5VAC	100VDC	100VDC	1VDC	--
‡ 5	6AL5	0V	-.4VDC	6.1VAC	0V	-.2VDC	0V	-.2VDC	--
6	6SQ7	0V	-.5VDC	0V	-.4VDC	.2VDC	60VDC	6.1VAC	12VAC
7	6SQ7	0V	-.5VDC	0V	0V	0V	58VDC	12VAC	18VAC
8	25L6GT	0V	45VAC	125VDC	120VDC	0V	127VDC	67VAC	9VDC
9	25L6GT	0V	67VAC	125VDC	120VDC	0V	0V	94VAC	9VDC

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

§TAKEN WITH VACUUM TUBE VOLTMETER.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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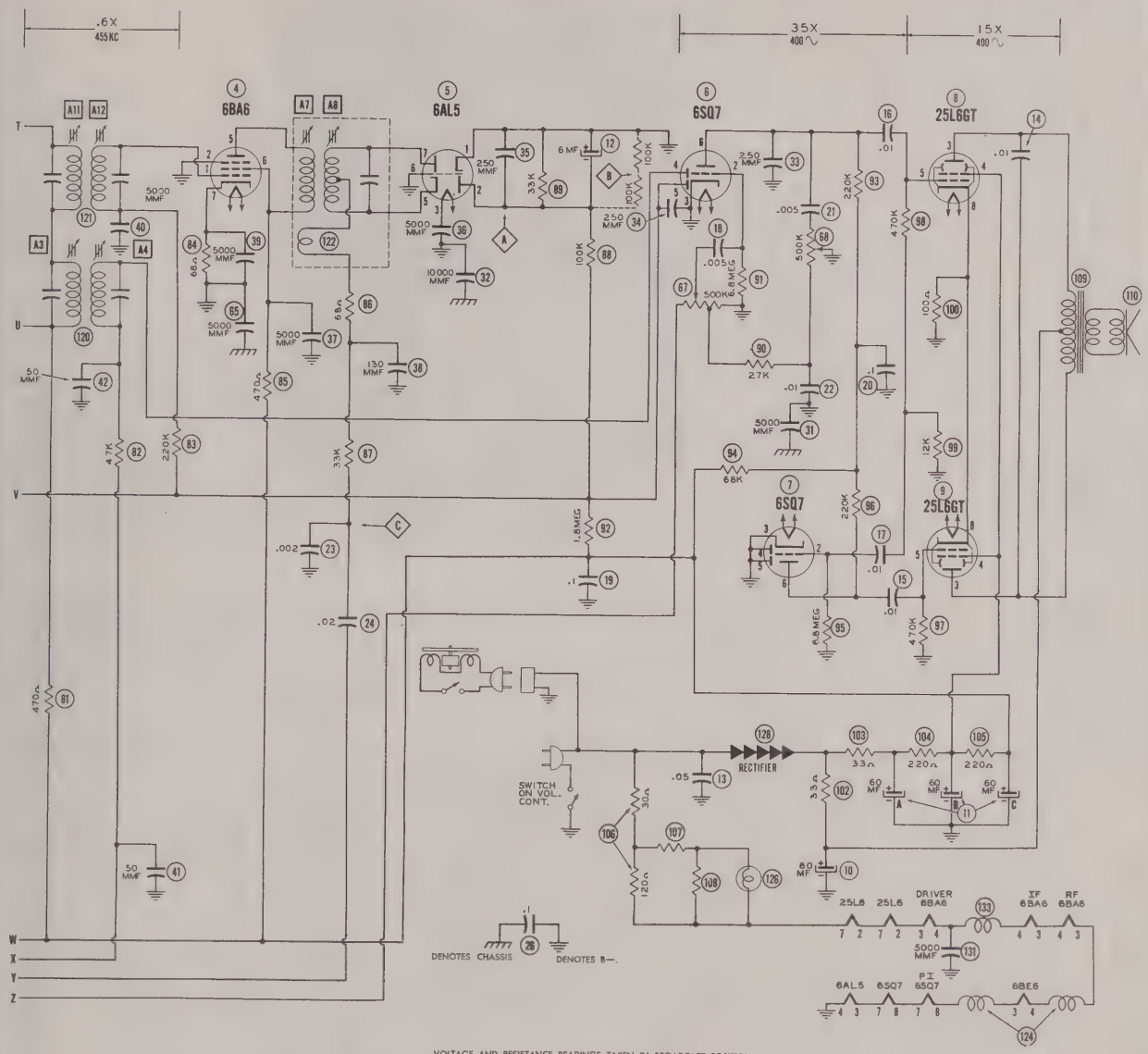
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

487-21

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	1.5MEG	0Ω	18Ω	22.5Ω	34KΩ	36KΩ	68Ω	—
2	6BE6	22KΩ	.1Ω	13Ω	17.5Ω	32KΩ	32KΩ	10KΩ	—
3	6BA6	4 MEG	0Ω	22.5Ω	27Ω	32KΩ	32KΩ	70Ω	—
‡ 4	6BA6	300KΩ	0Ω	32Ω	27Ω	32KΩ	32KΩ	70Ω	—
‡ 5	6AL5	0Ω	32KΩ	3.25Ω	0Ω	INF.	0Ω	INF.	—
6	6SQ7	INF.	7 MEG	0Ω	500KΩ	120KΩ	250KΩ	3.25Ω	8Ω
7	6SQ7	INF.	7 MEG	0Ω	0Ω	0Ω	250KΩ	8Ω	12.5Ω
8	25L6GT	INF.	32Ω	32KΩ	32KΩ	480KΩ	32KΩ	49Ω	100Ω
9	25L6GT	INF.	49Ω	32KΩ	32KΩ	470KΩ	0Ω	65Ω	100Ω

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

487-21

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FM ALIGNMENT

Connect two 100KΩ resistors (values within 5%) in series. Connect them between Point A and B- with an RF choke made by wrapping about 20 turns of hookup wire in series with each lead as shown in Fig. 1. Vacuum tube voltmeter is connected as shown. Connect a zero center microammeter to the junction of these resistors to Point C in series with a choke wound same as those above. If a zero center microammeter is not available a 20000Ω per volt meter may be used. However extreme care must be used to keep reading at zero.

This microammeter is left connected throughout entire FM alignment to correct an drift of the signal generator or local oscillator.

FM DISCRIMINATOR ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	250MMF.	High side to Pin #1 (grid) 6BA6 2nd IF Tube (4). Low side to B-.	10.7MC (unmodulated)	FM (clockwise)	Tuning cap. fully open.	VTVM and microammeter connected as shown in Fig. 1.	A7	Adjust for maximum deflection. Reduce signal generator to give approx. 5 volt reading.
5	250MMF.	"	"	"	"	"	A8	Adjust for zero reading on microammeter. A8 should not be touched after this step.

PRELIMINARY FM-IF ALIGNMENT

6	250MMF.	High side to Pin 7 (grid) 6BE6. Low side to B-.	10.7MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as shown in Fig. 1	A9,A10 A11,A12	Adjust for maximum deflection on VTVM. Attenuate signal to give approx 5 volt reading. Continue with Step 7 under VTVM or scope alignment.

FINAL FM-IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

7	250MMF.	High side to Pin 7 (grid) 6BE6. Low side to B-.	109MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as shown in Fig. 1	A13	Adjust for approx. maximum reading on VTVM and exact zero reading on microammeter.
8	250MMF	"	109MC (Freq.Mod. 400∿ 25KC deviation)	"	"	"	A9,A10, A11,A12 A7	Adjust for maximum reading on VTVM. Maintain zero reading on microammeter by shifting sig. gen. frequency if necessary. While making adjustments turn up volume. If signal is free of distortion increase deviation to 75KC and repeat adjustments of this step. If done carefully there will be no distortion. If distortion is present repeat Steps 6, 7 and 8. Continue with Step 9.

FINAL FM-IF ALIGNMENT USING FM SIGNAL GENERATOR, VTVM AND OSCILLOSCOPE

Make oscilloscope connections as shown in Fig. 2. If no phase shift is encountered in scope pattern (double trace) the internal 60∿ modulation frequency and synchronized sweep voltage of the signal generator may be used. If phase shift is encountered use the variable a-f oscillator in the signal generator (if so equipped) or an external a-f oscillator connected as shown in Fig. 2 for modulating the signal. The variable a-f oscillator can be shifted to give a single trace pattern. Use modulation freq. near 400∿.

At all times during alignment keep microammeter at zero by shifting signal generator frequency if necessary.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	250 MMF	High side to Pin 7 (grid) 6BE6. Low side to B-.	10.7MC (freq.mod. 25KC deviation)	FM	Tuning cap. fully open.	As shown in Fig. 2	A9,A10, A11,A12 A7.	Adjust for maximum reading on VTVM and straight line on scope as shown in Fig. 3.
8	250 MMF	"	10.7MC (freq.mod. 75KC deviation)	"	"	"	A9,A10, A11,A12 A7.	Adjust for maximum reading on VTVM and straight line on scope as shown in Fig. 3. After adjusting, increase deviation to approx. 125KC to 150KC. Pattern as shown in Fig. 3 should be obtained. If not repeat last two steps. Continue with Step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	*CONNECT VTVM	ADJUST	REMARKS
9	2 150Ω carbon res.	Across FM dipole terminals.	109MC (unmodulated)	FM	Tuning cap. fully open.	Meters connected as in Fig. 1.	A13	Adjust for approx. maximum reading on VTVM and exact zero center on microammeter.
10	"	"	106MC	"	Tune for maximum deflection on VTVM.	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.
11	"	"	98MC	"	"	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection.
12	"	"	90MC	"	"	"		Bend slightly FM rotor plates of ant. section of tuning cap. for maximum deflection. Repeat Steps 10, 11 & 12 until no further improvement can be made.

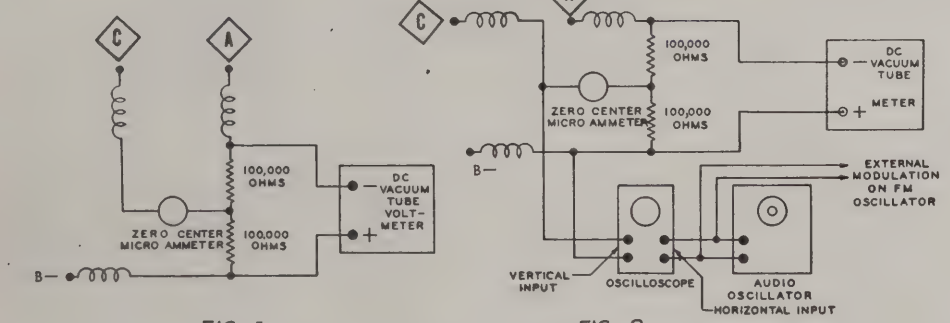


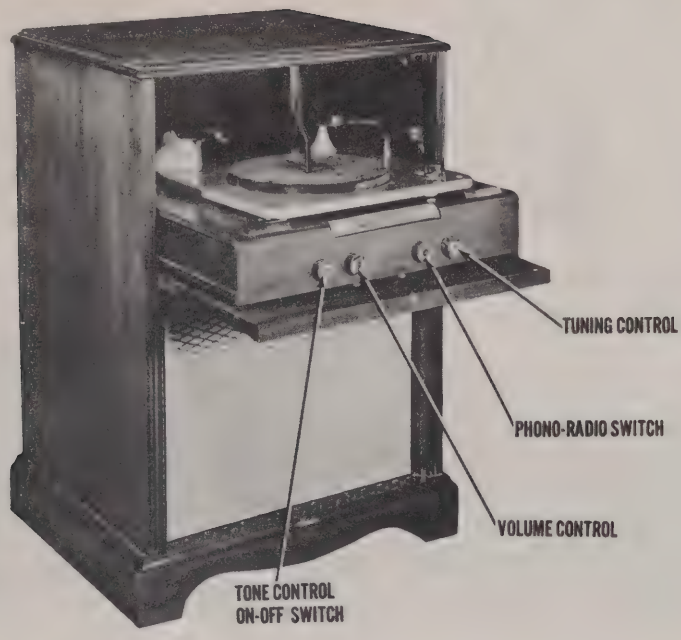
FIG 1

FIG. 2

FIG. 3

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

SPARTON MODELS 1030, 1030A (Ch. 6L8)



SPARTON MODEL 1030

TRADE NAME	Sparton, Models 1030, 1030A (Ch. 6L8)
MANUFACTURER	Sparks Withington Co., Jackson, Mich.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SK7 RF Amp., 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .26 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are three calibration marks on dial backplate. Reading from left to right they are: end limit, 600KC and 1500KC. Turn tuning cap. fully closed and set pointer to end limit mark.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02 MFD	High side to Pin 6 (grid) 12SA7. Low side to B-.	456KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.02 MFD	High side to ext. ant. clip. Low side to B-.	"	Tuning cap. fully closed	"	A5	Adjust for minimum output.
3		Loop	1500KC	1500KC calibration mark	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4		"	"	Tune for maximum output.	"	A7	Adjust for maximum output.
5		"	600KC	"	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.

DISASSEMBLY INSTRUCTIONS

1. Remove speaker leads from speaker.
2. Remove loop leads from loop antenna.
3. Roll changer and chassis drawer out. Lift up on front of drawer and remove from cabinet.
4. Lift up changer and disconnect phono-motor plug. Remove phono-pickup plug from chassis. Remove changer from mounting board.
5. Remove three hex head screws holding chassis in cabinet. Slide chassis out of drawer.
6. Remove two hex nuts holding speaker in cabinet. Remove speaker from cabinet.
7. Remove two wood screws holding loop in cabinet. Remove loop from cabinet.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

SPARTON MODEL 1030

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SPARTON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12SK7	12SK7	8N	
2	Converter	12SA7	12SA7	8R	
3	IF Amp.	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SPARTON PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	PA4304-1	EL-35	AF88D	UP4315	DY-4030-150	◘ Filter
B	30	150						▲ "
8	.05	400	PC40HL-503	TC-15	484-05	DT4S5	ST-4-05	Rectifier Bypass
9	.03	400	PC40GL-303	TC-13	484-03	DT4S3	ST-4-03	Output Plate Bypass
10	.001	600	PC40GL-102	TC-21	684-001	DT6D1	ST-6-001	Tone Comp.
11	.01	400	PC40HK-103	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
12	.1	200	PC40HK-104	TC-1	484-.1	DT2P1	ST-2-1	RF Bypass Power Supply
13	.01	400	PC40HK-103	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
14	.05	400	PC40HL-503	TC-15	484-05	DT4S5	ST-4-05	Line Isolation
15	.05	200	PC40GK-503	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
16	.01	400	PC40HK-103	TC-11	484-01	DT4S1	ST-4-01	RF Cathode Bypass
17	510	500	MC60G-511	1FM-35	1468-0005	5W5T5	MO.5-35	Diode RF Filter
18	51	500	MC60F-510	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.
19	100	500	MC60F-101	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling
20	150	500	MC60F-151	1FM-315	1468-00015	5W5T15	MO.5-315	" "

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
21A	500KΩ	½	PA4402-3	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 21A per instructions
22A	500KΩ	½	PA4400-2	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 22A per instructions
C	Switch		" "	41	SW-A	" " " " "

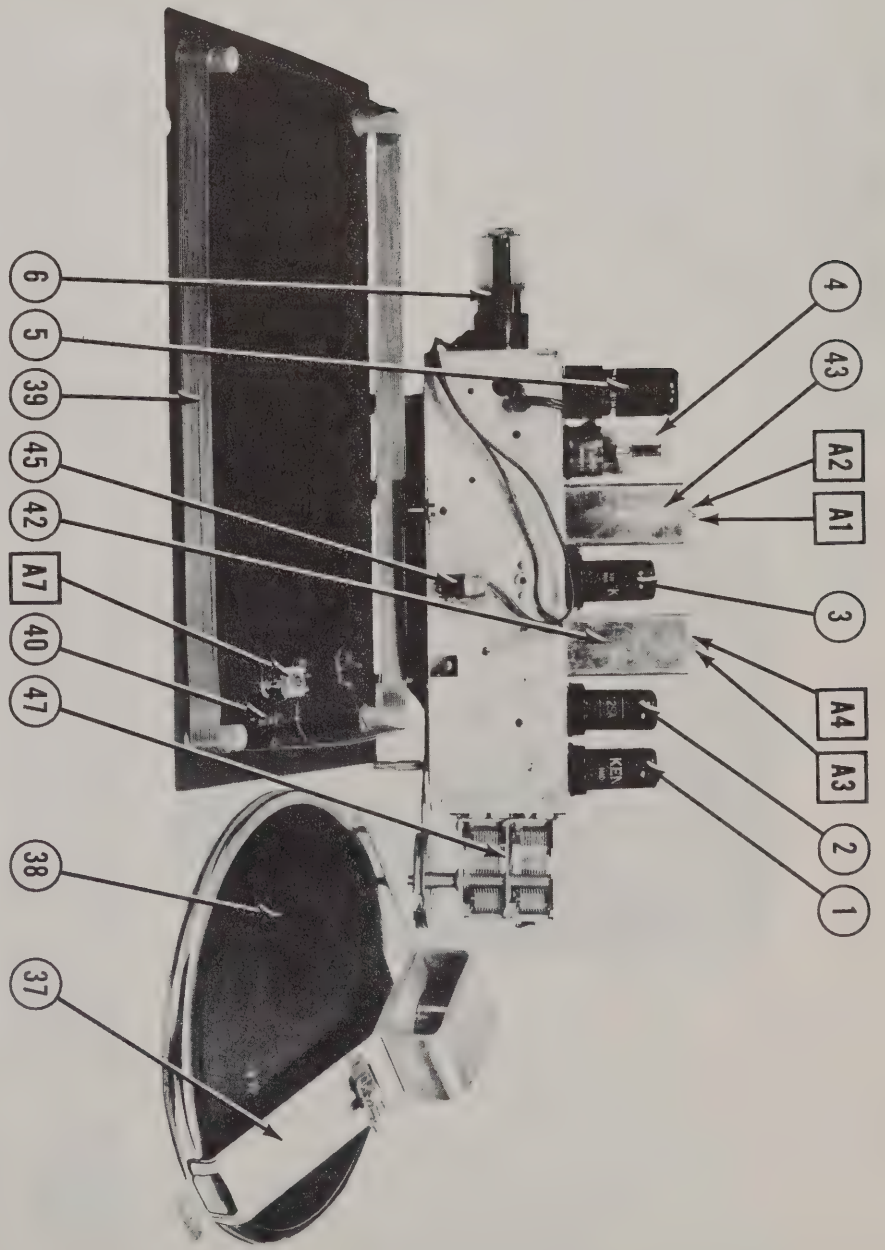
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	IDENTIFICATION CODES
23	500KΩ	½	BR12S-504	BTS-470K	Grn.-Blk.-Yl. RF Grid
24	470Ω	½	BR12G-471	BTS-470	Yl.-Vi.-Br. RF Cathode
25	10 Meg.	½	BR12S-106	BTS-10 Meg.	Br.-Blk.-blue AVC Network
26	68KΩ	½	BR12S-683	BTS-68K	Blue-Gray-Or. Converter Grid
27	22KΩ	½	BR12S-223	BTS-22K	Red-Red-Or. Oscillator Grid
28	5100Ω	½	BR12G-512	BTS-4700	Grn.-Br.-Red RF Plate Load
29	1 Meg.	½	BR12S-105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
30	56KΩ	½	BR12G-563	BTS-56K	Grn.-Blue-Or. Diode RF Filter
31	10 Meg.	½	BR12S-106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	270KΩ	½	BR12S-274	BTS-270K	Red-Vi.-Yl. AF Plate Load
33	180Ω	½	BR12S-181	BW-½-180	Br.-Gray-Br. Output Cathode
34	1200Ω	1	BR12S-122	BTA-1200	Br.-Red-Red Filter
35	82Ω	½	BR12S-270	BW-½-82	Gray-Red-Blk. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SPARTON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
36	2300Ω	3.5Ω	170Ω tapped @ 8Ω	.6Ω	AB44058-3	A-3876‡		A-2928‡	‡Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SPARTON PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-120*†	10A31*	*Drill new mounting holes.
37	PM	3.5Ω	PC63000-20	Mod. P10-8		†Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
38	9¼"	1"				

R F COILS

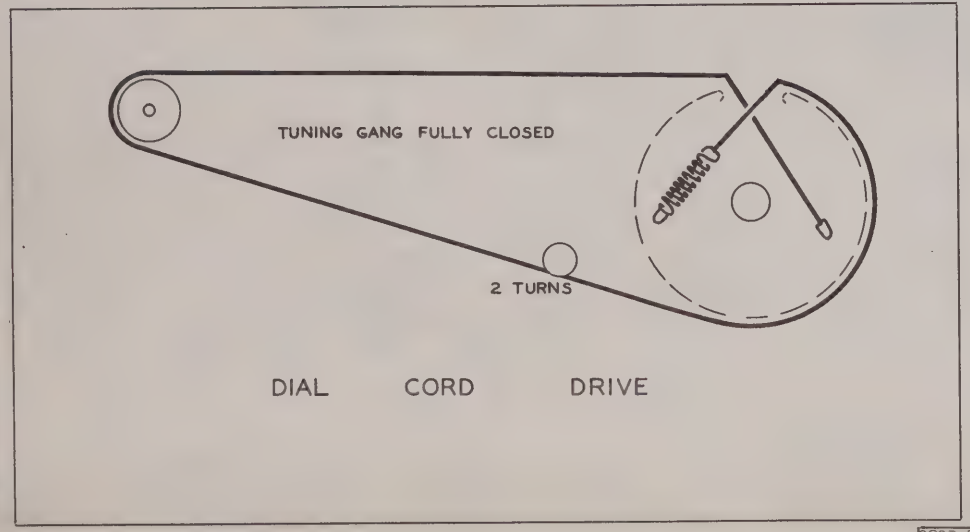
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SPARTON PART No.	MEISSNER PART No.
39	Loop Ant.	.1Ω	1.2Ω	AC67018-1	
40	Loop Load. Coil		1.2Ω	AA6686-1	
41	Osc. Coil	.4Ω	4Ω	AA6797-2	14-1060
42	Input IF	6Ω	9Ω	AA6800-1	16-6658
43	Output IF	11Ω	5Ω	AA6800-4	16-6660
44	Wave Trap		26Ω	AA6787-1	

DIAL LIGHT

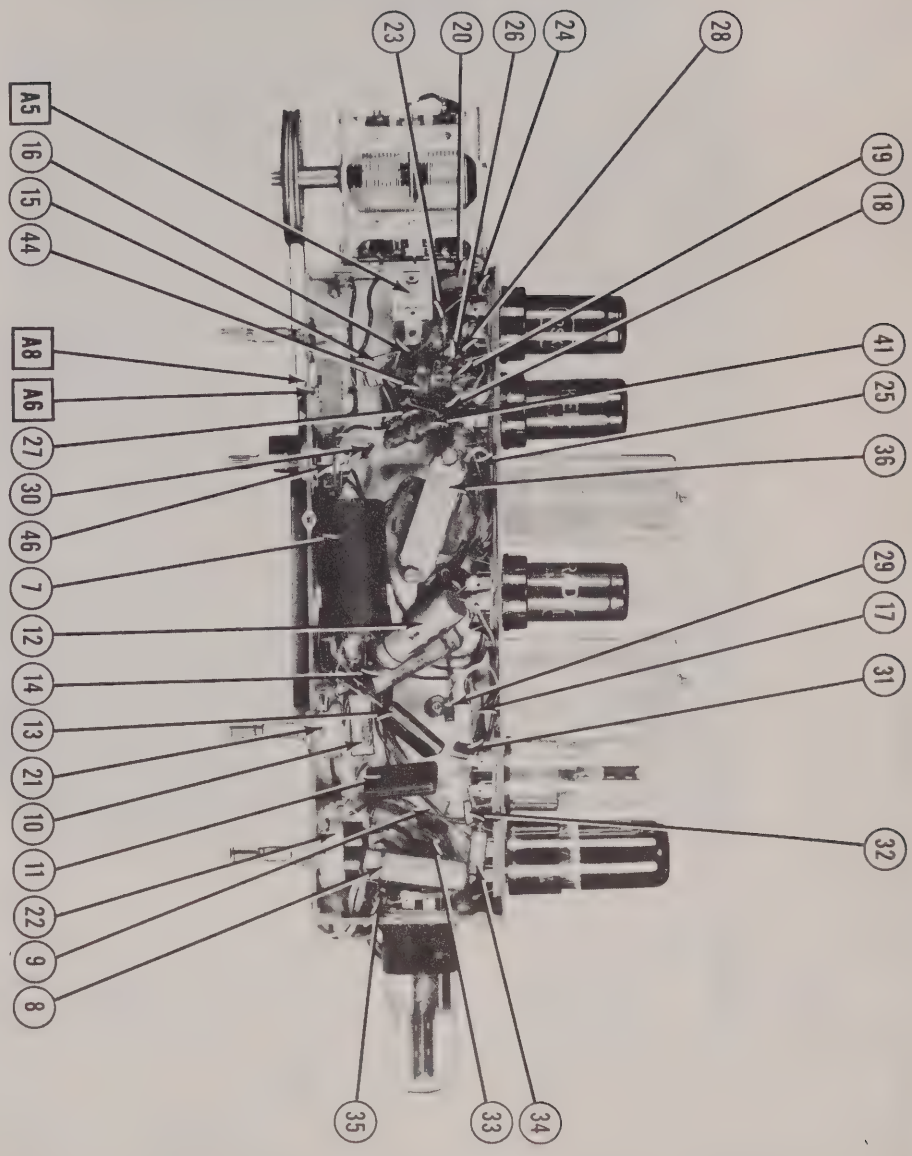
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: SPARTON PART No.		INSTALLATION NOTES
45	Bayonet	7.5	0.2	White			Type 51

MISCELLANEOUS

ITEM No.	PART NAME	SPARTON PART No.	NOTES
46	Switch	PA4602-2	Radio-Phono
47	2 Gang Var. Cap.	PB40410	(12-412 MMF) each section
A7 }	Trimmer Strip	PA4356	Osc. Pad.
A8 }			Osc. Adj.
	Dial Pointer	PA5408	

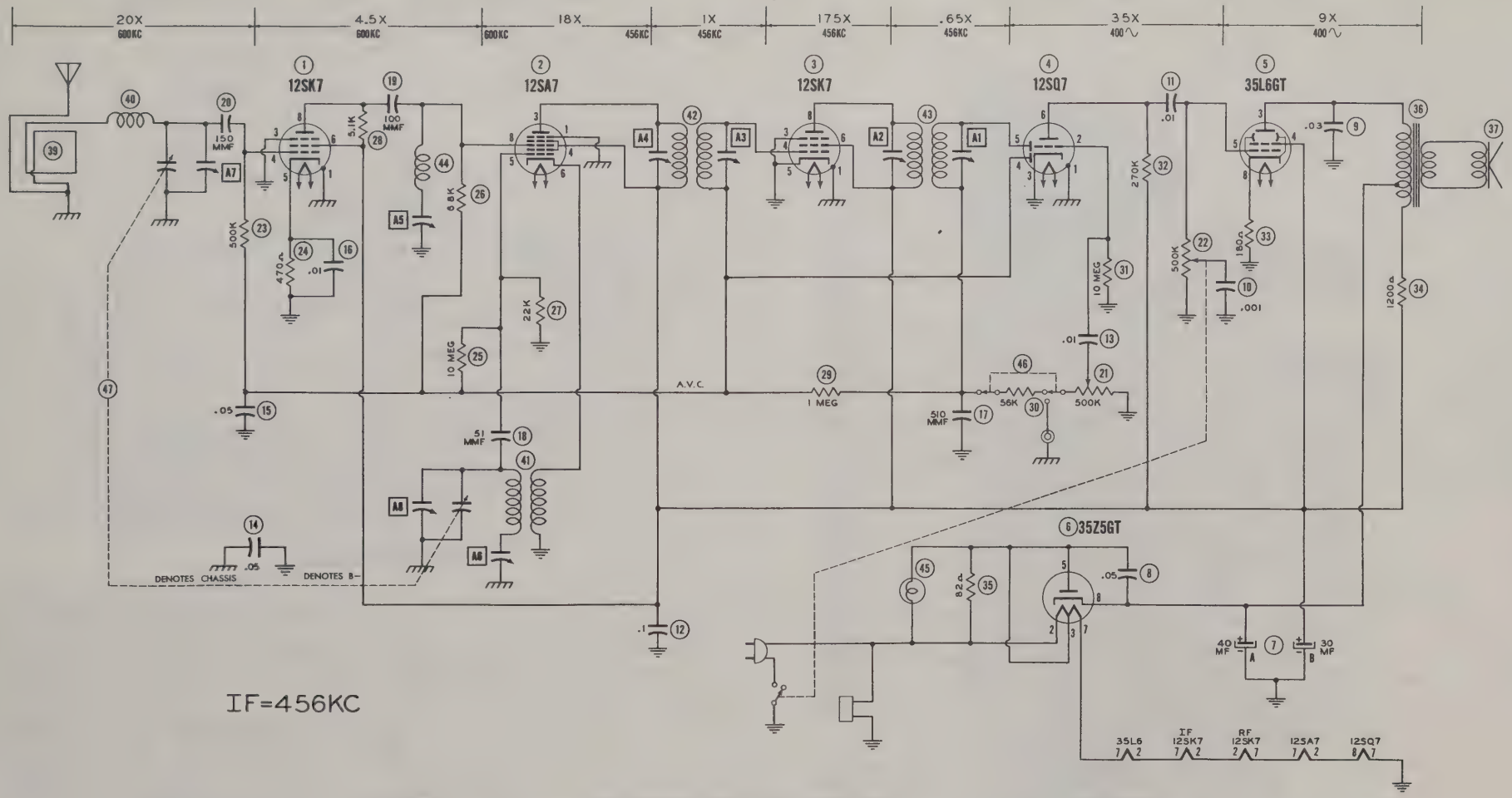


CHASSIS—BOTTOM VIEW



SPARTON MODEL 1036

SPARTON MODEL 1036



VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	0V.	39VAC	0V.	-.2VDC	1.6VDC	90VDC	26VAC	65VDC
2	12SA7	0V.	13VAC	90VDC	90VDC	-7.5VDC§	0V.	26VAC	-.6VDC
3	12SK7	0V.	39VAC	-.7VDC	-.7VDC	0V.	90VDC	51VAC	90VDC
4	12SQ7	0V.	-.7VDC	0V.	-.7VDC	-.5VDC	62VDC	0V.	13VAC
5	35L6GT	0V.	51VAC	122VDC	90VDC	0V.	127VDC	82VAC	5.8VDC
6	35Z5GT	0V.	117VAC	115VAC	0V.	115VAC	0V.	82VAC	127VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	INF.	36Ω	0Ω	2 Meg.	470Ω	100KΩ	24Ω	105KΩ
2	12SA7	INF.	13Ω	100KΩ	100KΩ	22KΩ	.4Ω	24Ω	1.5 Meg.
3	12SK7	INF.	36Ω	1.5 Meg.	1.5 Meg.	0Ω	100KΩ	48Ω	100KΩ
4	12SQ7	INF.	10 Meg.	0Ω	1.5 Meg.	550KΩ	370KΩ	0Ω	13Ω
5	35L6GT	INF.	48Ω	100KΩ	100KΩ	500KΩ	100KΩ	80Ω	170Ω
6	35Z5GT	INF.	110Ω	110Ω	INF.	110Ω	INF.	80Ω	100KΩ

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

PHOTOFACT* Folder

*TRADE MARK

STROMBERG-CARLSON MODELS 1210M2-M, 1210M2-W, 1210M2-Y, 1210PGM, 1210PLM, 1210PGW

STROMBERG-CARLSON MODELS
1210M2-M, 1210M2-W, 1210M2-Y,
1210PGM, 1210PLM, 1210PGW

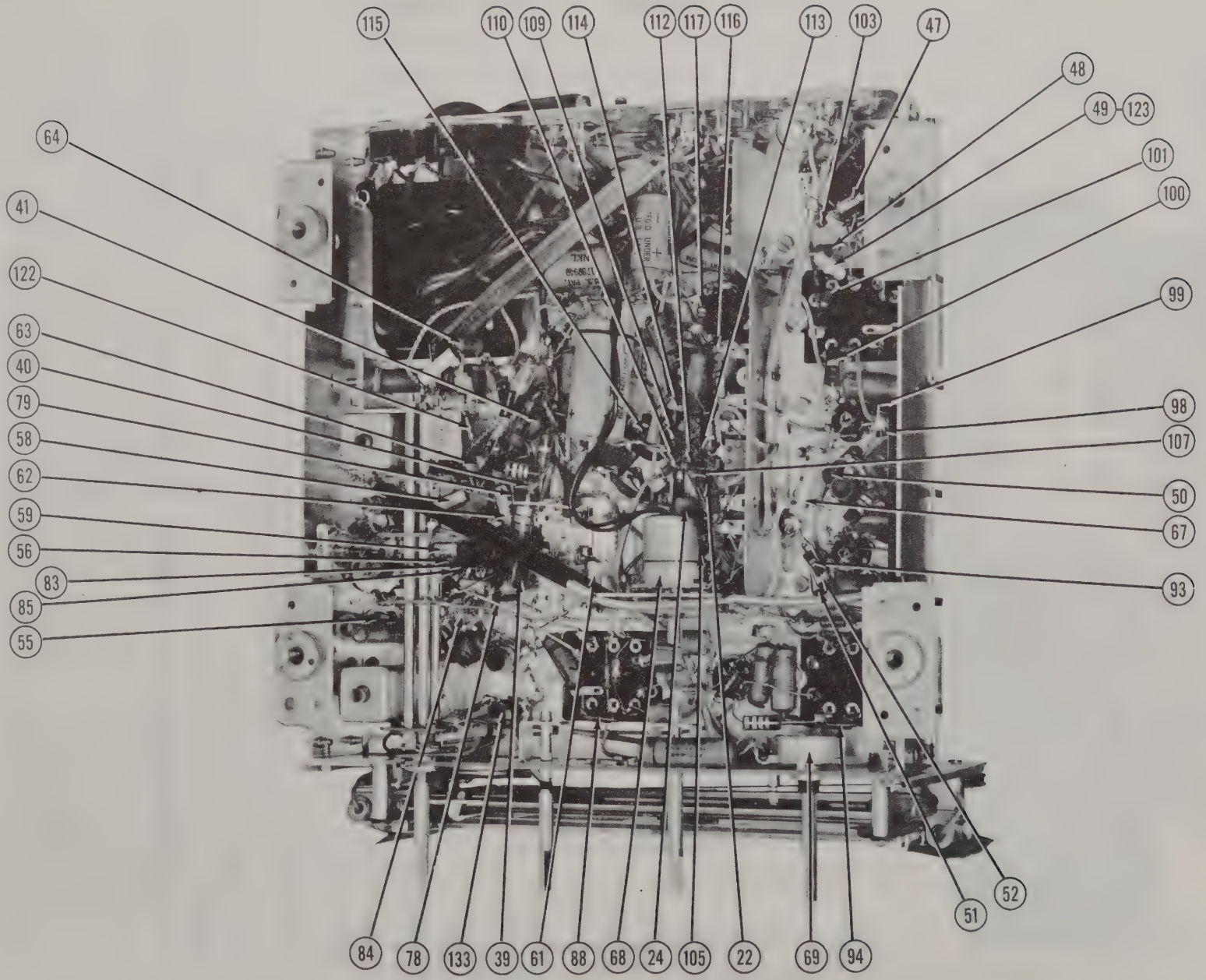
STROMBERG-CARLSON MODELS
1210M2-M, 1210M2-W, 1210M2-Y,
1210PGM, 1210PLM, 1210PGW PAGE 1

STROMBERG-CARLSON 1210PLM

TRADE NAME	Stromberg-Carlson, Models 1210M2-M, 1210M2-W, 1210M2-Y, 1210 PGM, 1210 PLM, 1210 PGW (Series 10-11)
MANUFACTURER	Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N.Y.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (ELEVEN)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AU6 Driver, 6H6 Ratio Det., 6AT6 AM Det.-AVC-AF, 6SC7 AF-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.84 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1700KC FREQ. MOD. 42-50MC, 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6BA6	6BA6	7BK	
5	Driver	6AU6	6AU6	7BK	
6	Ratio Det.	6H6	6H6	7Q	
7	AM Det.-AVC-AF	6AT6	6AT6	7BT	
8	AF-Phase Inv.	6SC7	6SC7	8S	
9	Power Output	6V6GT	6V6GT	7AC	
10	" "	6V6GT	6V6GT	7AC	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12A	20	450	111025	EL-420*	AF4444J*	UP222245*	DY-4x20-450*	◓ Filter
B	30	450						■ "
C	20	400						▲ "
13	20	250	111031	UT-202	PRS250-20	BR2025	M-20-350	"
14	25	25	111026	TA-25	PRS25-25	BR252A	M-25-25	Cathode Bypass
15	25	25	111026	TA-25	PRS25-25	BR252A	M-25-25	" "
16	5	50	111030	TA-25	PRS150-4	BR550	M-4-450	Stabilizing Cap.
17	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	RF Bypass Power Supply
18	.002	600	27646	TC-22	684-02	DT6D2	ST-6-002	Output Plate Bypass
19	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
20	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
21	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
22	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
23	.02	600	25484	TC-12	684-02	DT6S2	ST-6-02	Tone Compensation
24	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
25	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
26	.005	500	110419	TC-25	684-005	DT6D5	ST-6-005	" "
27	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Fil. Bypass
28	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	AVC Filter
29	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Driver Plate Decoupling
30	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Driver Screen Bypass
31	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	2nd IF Plate Decoup.
32	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	2nd IF Screen Bypass
33	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Fil. Bypass
34	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	1st IF Plate Decoup.
35	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	1st IF Screen Bypass
36	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	AVC Filter
37	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
38	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Conv. Plate Decoup.
39	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	Conv. Screen Bypass
40	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	RF Screen Bypass
41	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	RF Filament Bypass
42	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	AVC Filter
43	.01	500	110420	TC-11	684-01	DT6S1	ST-6-01	" "
44	.02	600	25484	TC-12	684-02	DT6S2	ST-6-02	Phono Tone Comp.
45	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	AF Plate Bypass-Cer.
46	75		110483	1FM-475	1468-000075	5W5Q7	MOS.5-47	Diode Load Cap.-Cer.
47	75		110483	1FM-475	1468-000075	5W5Q7	MOS.5-47	" " " "
48	47		110402	1FM-45	1468-00005	5W5T5	MO.5-45	De-emphasis - "
49A	100		110478	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter- "
B	100			1FM-31	1468-0001	5W5T1	MO.5-31	" " " - "
50	47		110402	1FM-45	1468-0005	5W5Q5	MO.5-45	IF Coupling - "
51	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter- "
52	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	" " " - "
53	20		110496	MS-42		5W5Q2	MOS.5-42	Feedback - "
54	47		110402	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap. - "
55	10		110496	MS-41	1469-00001	5R5Q1	MOS.5-41	Fixed Trimmer - "
56	470		110455	1FM-35	1468-0005	5W5T5	MO.5-35	RF Bypass - "
57	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling - "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
100	22KΩ	1	149116	BTA-22K	Red-Red-Or. Driver Screen Dropping
101	22KΩ	½	149109	BTS-22K	Red-Red-Or. De-emphasis
102	470KΩ	½	149117	BTS-470K	Yl.-Vi.-Yl. AVC Network
103	6800Ω	½	149239	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
104	6800Ω	½	149239	BTS-6800	Blue-Gray-Red " " " "
105	3900Ω	½	28165	BTS-3900	Or.-White-Red Tone Compensation
106	4.7 Meg.	½	149123	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
107	390KΩ	½	28186	BTS-390K	Or.-White-Yl. AF Plate Load
108	27KΩ	½	28174	BTS-27K	Red-Vi.-Or. Tone Compensation - See Note 1
109	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. " "
110	15KΩ	½	149108	BTS-15K	Br.-Grn.-Or. 2nd AF Grid
111	2700Ω	½	28163	BTS-2700	Red-Vi.-Red 2nd AF Cathode
112	390KΩ	½	28186	BTS-390K	Or.-White-Yl. 2nd AF Plate Load
113	1 Meg.	½	149119	BTS- 1 Meg.	Br.-Blk.-Grn. Phase Inverter Grid
114	390KΩ	½	28186	BTS-390K	Or.-White-Yl. Phase Inverter Plate Load
115	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. Decoupling
116	470KΩ	½	149117	BTS-470K	Yl.-Vi.-Yl. Output Grid
117	12KΩ	½	28171	BTS-12K	Br.-Red-Or. " "
118	470KΩ	½	149117	BTS-470K	Yl.-Vi.-Yl. " "
119	330Ω	2	149020	BW-2-330	Or.-Or.-Br. Output Cathode
120	10KΩ	1	149144	BTA-10K	Br.-Blk.-Or. Tone Compensation
121	1000Ω	10	149126	AB-1000	Filter
122	2700Ω	½	28163	BTS-2700	Red-Vi.-Red Parasitic Suppressor
123	47KΩ	½	110478	BTS-47K	Br.-Blk.-Yl. Diode RF Filter - See Note 3

Note 1 - Used in Series #10.
Note 2 - Used in Series #11.
Note 3 - Part of Diode Filter unit composed of Items 49A, 49B and 123.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
124	117VAC @ .84A.	670VCT @ .125A	5.1VAC @ 2.0A	6.4VAC @ 3.9A	161411	P-6013	T22R05	P-2953

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: STROM. CARL. PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
125	.125A	90Ω	3.5 Henries	161006	C-2303†			†Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: STROMBERG CARLSON PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
126	14000 Ω CT	5.7Ω	340Ω CT	.5Ω	161226	A-3852	T22S56†	A-2904	†Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-102		
127	PM	5.7Ω	48997	Mod. P12-S	12A4	
	CONE DIA.	VC DIA.				
128	11-3/4"	7/8"				

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	STROMBERG-CARLSON PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
58A	24			MS-425	1468-000025	5W5Q25	MO.5-425	RF Coupling-See Note
B	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling - Cer.
59	24		110403	MS-425	1468-000025	5W5Q25	MO.5-425	" " - "
60A	24			MS-425	1468-000025	5W5Q25	MO.5-425	" " -See-Note
B	47		110402	1FM-45	1468-00005	5W5Q5	MO.5-45	" " - Cer.
61	470		110455					Fixed Trimmer - "
62	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	RF Cathode Bypass-"
63	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling -"
64	1000		110425	1FM-21	1467-001	1W5D1	MW.5-21	Fixed Padder -"
65	100		110401	1FM-31	1468-0001	5W5T1	MO.5-31	Ant. Coupling -"
66	750		110456	1FM-37	1468-00075	1W5T8	MO.3-38	Tone Comp.
67	100		110476	MS-31	1469-0001	5R5T1	MOS.5-31	Fixed Trimmer-Cer.

Note-Used in series 11.
*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	STROMBERG-CARLSON PART No.	IRC PART No.	CLAROSTAT PART No.	
68A	1 Meg.	½	145029	D18-137X	T-110	Volume Control tapped @ 150KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 68A per instructions
C	Switch		" "	41	SW-A	" " " " "
69A	2.5 Meg	½	145028		M-83-S	Tone Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	STROMBERG-CARLSON PART No.	IRC PART No.	
70	220KΩ	½	149115	BTS-220K	Red-Red-Yl. Wire Recorder Shunt
71	1 Meg.	½	149119	BTS-1 Meg.	Br.-Blk.-Grn. Series Wire Recorder
72	68KΩ	½	149112	BTS-68K	Blue-Gray-Or. Tone Compensation
73	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. Series Phono
74	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. " "
75	1 Meg.	½	149119	BTS-1Meg.	Br.-Blk.-Grn. RF Grid
76	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. AVC Network
77	2.2 Meg.	½	149121	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
78	1 Meg.	½	149119	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid - See Note 2
79	68Ω	½	149094	BW-½-68	Blue-Gray-Blk. RF Cathode
80	39KΩ	1	149189	BTA-39K	Or.-White-Or. RF Screen Dropping
81	100Ω	½	149095	BW-½-100	Br.-Blk.-Br. RF Plate Load
82	5600Ω	1	149184	BTA-5600	Grn.-Blue-Red RF Plate Decoupling
83	33KΩ	½	149110	BTS-33K	Or.-Or.-Or. Oscillator Grid
84A	10Ω	½	149089	BW-½-10	Br.-Blk.-Blk. Parasitic Suppressor - See Note 1
B	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. Converter Grid - See Note 2
85	1000Ω	½	149101	BTS-1000	Br.-Blk.-Red Converter Cathode
86	18KΩ	2	149057	BW-2-18K	Br.-Gray-Or. Converter Screen Dropping
87	1000Ω	½	149101	BTS-1000	Br.-Blk.-Red Decoupling
88	1000Ω	½	149101	BTS-1000	Br.-Blk.-Red Converter Plate Decoupling
89	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. AVC Network
90	150Ω	½	149096	BW-½-150	Br.-Grn.-Br. 1st IF Cathode
91	39KΩ	1	149189	BTA-39K	Or.-White-Or. 1st IF Screen Dropping
92	100KΩ	½	149113	BTS-100K	Br.-Blk.-Yl. Diode RF Filter
93	560KΩ	½	28188	BTS-560K	Grn.-Blue-Yl. Diode Load
94	1000Ω	½	149101	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
95	68Ω	½	149094	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
96	39KΩ	1	149189	BTA-39K	Or.-White-Or. 2nd IF Screen Dropping
97	1000Ω	½	149101	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
98	18KΩ	½	28173	BTS-18K	Br.-Gray-Or. Driver Grid
99	68Ω	½	149094	BW-½-68	Blue-Gray-Blk Driver Cathode

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	STROMBERG-CARLSON PART No.	MEISSNER PART No.
129	Loop Ant.		.2Ω		
130	AM Ant.Coil		8.5Ω	114041	
131	FM Ant.Coil	0Ω	0Ω	114035	
132	AM RF Coil		8Ω	114041	
133	AM RF Trim Coil		.8Ω	114040	
134	FM RF Coil		0Ω	114029	
135	AM OSC Coil		5.5Ω	114041	
136	AM OSC Coil		7.9Ω	114038	
137	AM OSC Trim Coil		8Ω	114039	
138	FM OSC Coil		0Ω	114037	
139A	AM Input IF	9.5Ω	9.5Ω	114332	
B	FM Input IF	.6Ω	.1Ω	114332	
140A	AM Output IF	9.2Ω	9.2Ω	114328	
B	FM Inter.IF	.5Ω	.2Ω	114328	
141	FM Output IF		.1Ω	114329	
142	FM Rat.Det.	.8Ω	.5Ω	161228	
143	Plate Choke		1.9Ω	114614	
144	Fil.Choke		.2Ω	114618	
145	Fil.Choke		.2Ω	114618	

DIAL LIGHT

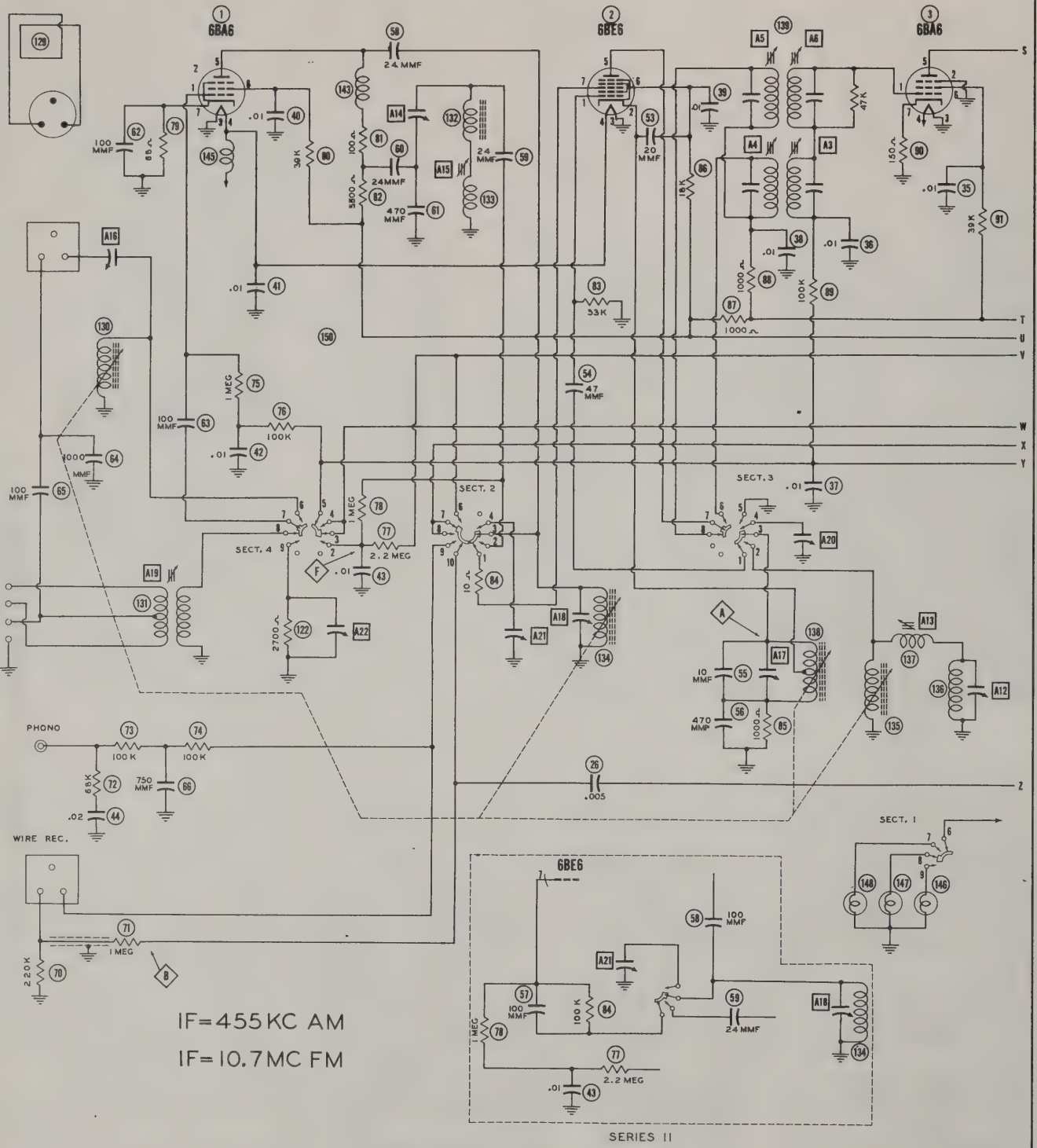
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					STROMBERG-CARLSON PART No.		
146-149	Bayonet	6-8	.0.25	Blue	29956		Type 44

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	STROM.CARL. PART No.	ASTATIC PART No.	
150		QT3-M or QT3-J	Has QT as original part.

MISCELLANEOUS

ITEM No.	PART NAME	STROMBERG-CARLSON PART No.	NOTES
151	Switch	158020	Band-Phono
152	Tuning Assby	164005	
	Trimmer Strip	110019	A12,A14,A16
A17	Trimmer	110023	FM OSC ADJ
	Trimmer Strip	110020	A18,A20,A21
A22	Trimmer	110022	FM Ant.ADJ
	Dial Scale	122016	FM 1
	Dial Scale	122017	FM 2
	Dial Scale	122018	BC
	Dial Pointer	144011	BC
	Dial Pointer	144012	FM



THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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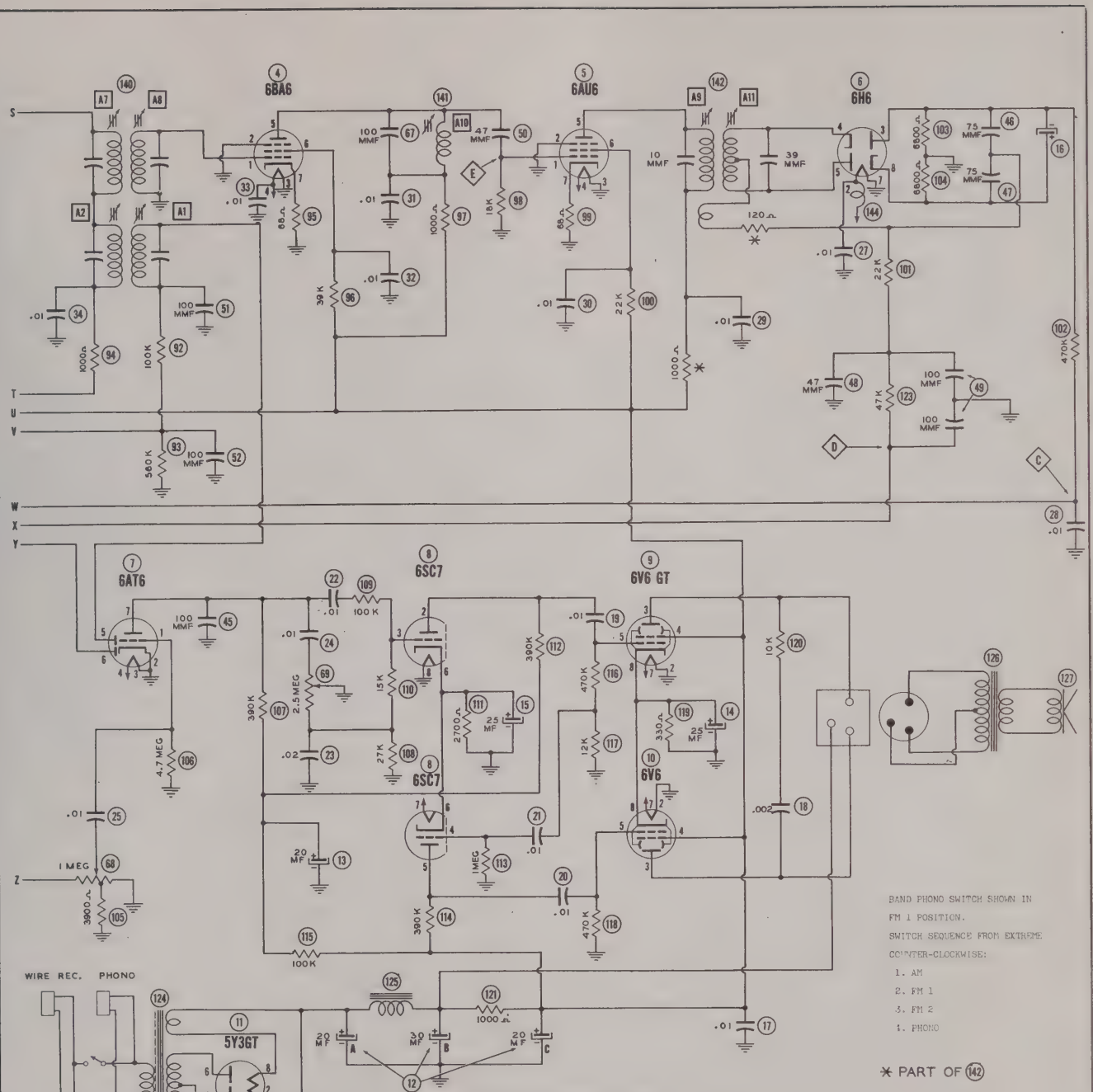
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	7.5X	600KC
RF GRID TO CONVERTER GAIN	6.5X	600KC
CONVERTER GAIN	20X	IN 600KC OUT 455KC
1st IF TRANSFORMER	.8X	455KC
1st IF TUBE	100X	455KC
2nd IF TRANSFORMER	.6X	455KC
1st AUDIO	30X	400~
2nd AUDIO	40X	400~
OUTPUT	10X	400~

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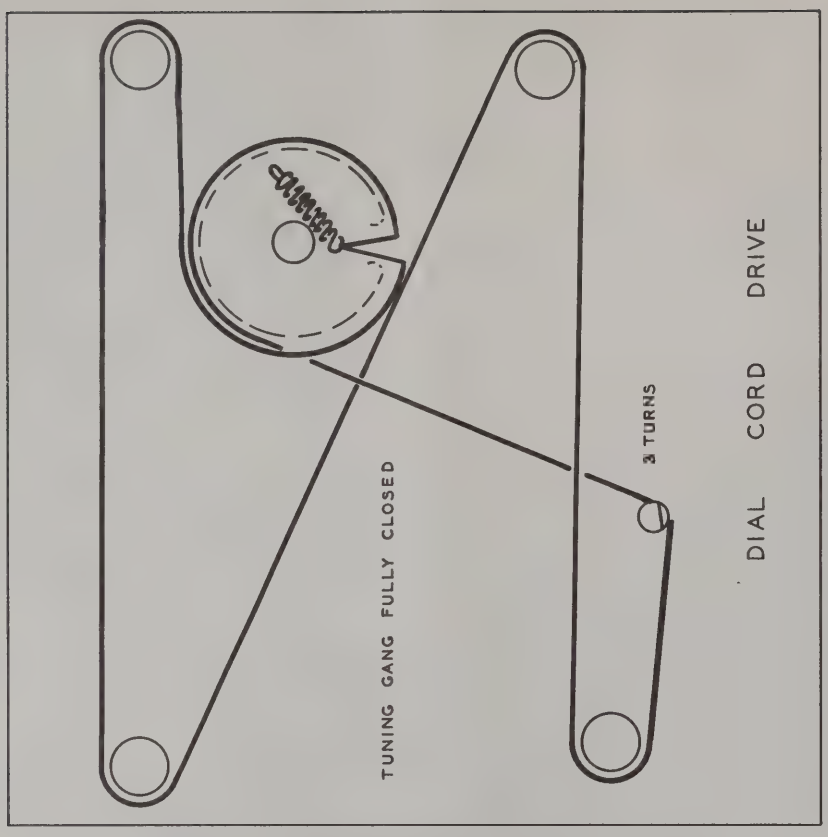


VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.1VDC	0V.	0V.	6.3VAC	200VDC	125VDC	.8VDC	-
2	6BE6	-8VDC§	0V.	0V.	6.4VAC	245VDC	92VDC	-.6VDC	-
3	6BA6	-.4VDC	0V.	0V.	6.4VAC	240VDC	117VDC	1.5VDC	-
‡ 4	6BA6	0V.	0V.	0V.	6.4VAC	250VDC	87VDC	.9VDC	-
‡ 5	6AU6	0V.	0V.	0V.	6.4VAC	250VDC	162VDC	1.2VDC	-
‡ 6	6H6	0V.	6.3VAC	-.4VDC	-7VDC	0V.	0V.	0V.	.4VDC
7	6AT6	-.6VDC	0V.	0V.	6.4VAC	-.4VDC	-.5VDC	62VDC	-
8	6SC7	0V.	98VDC	0V.	0V.	116VDC	1.6VDC	6.4VAC	0V.
9	6V6GT	0V.	0V.	330VDC	260VDC	0V.	0V.	6.4VAC	16.5VDC
10	6V6GT	0V.	0V.	330VDC	260VDC	0V.	330VDC	6.4VAC	16.5VDC
11	5Y3GT	0V.	340VDC	0V.	335VAC	0V.	335VAC	0V.	340VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

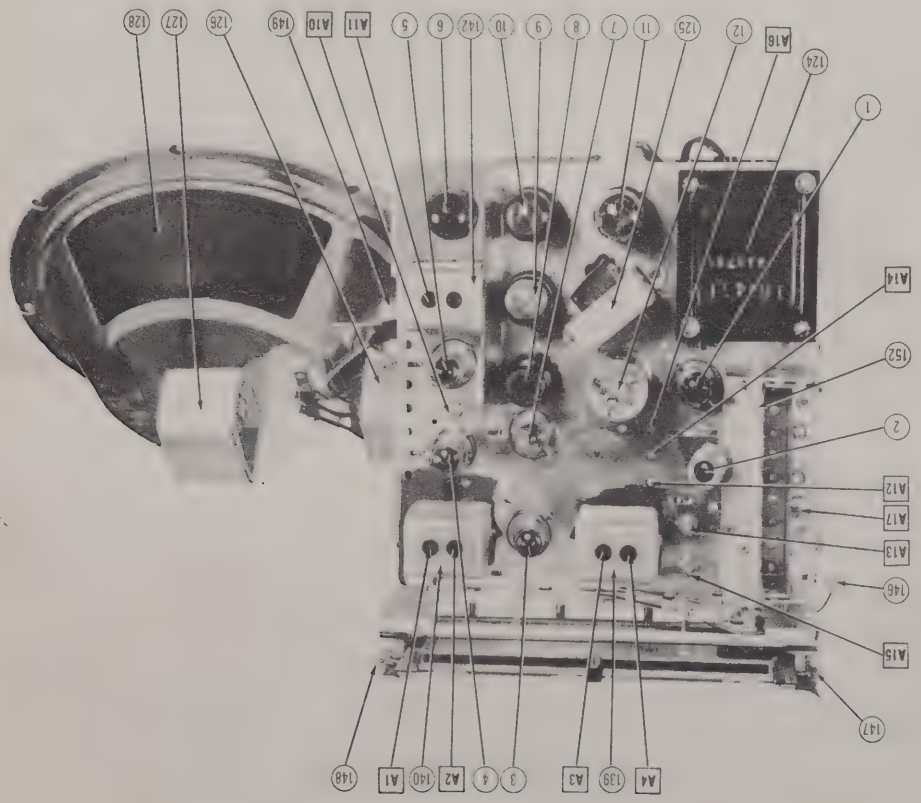
RESISTANCE READINGS

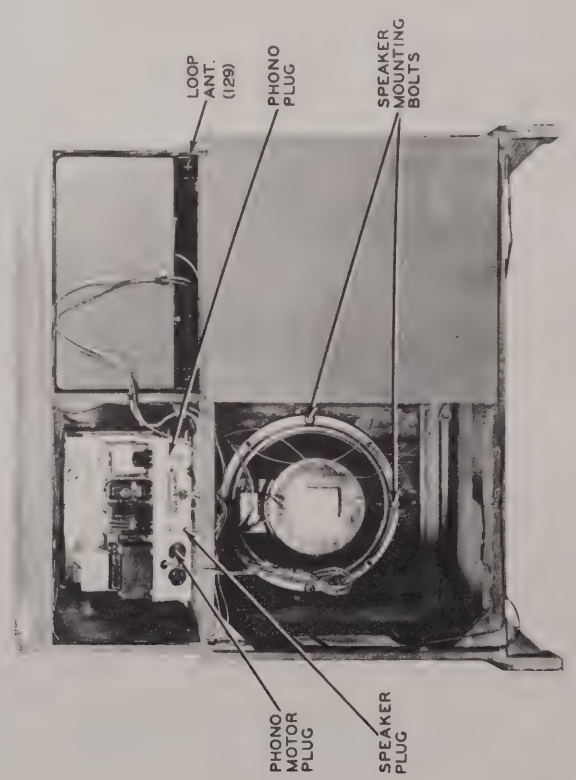
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	4 Meg.	0Ω	0Ω	.3Ω	66KΩ	100KΩ	70Ω	-
2	6BE6	30KΩ	1Ω	0Ω	.1Ω	63KΩ	72KΩ	4 Meg.	-
3	6BA6	3 Meg.	0Ω	0Ω	.1Ω	63KΩ	100KΩ	150Ω	-
‡ 4	6BA6	.2Ω	0Ω	0Ω	.1Ω	62KΩ	100KΩ	70Ω	-
‡ 5	6AU6	18KΩ	0Ω	0Ω	.1Ω	62KΩ	83KΩ	70Ω	-
‡ 6	6H6	0Ω	.3Ω	6.8KΩ	1.2 Meg.	1.2 Meg.	1.2 Meg.	0Ω	6.8KΩ
7	6AT6	5 Meg.	0Ω	0Ω	.1Ω	500KΩ	3 Meg.	550KΩ	-
8	6SC7	0Ω	550KΩ	32KΩ	1 Meg.	450KΩ	2.6KΩ	.1Ω	0Ω
9	6V6GT	0Ω	0Ω	60KΩ	60KΩ	500KΩ	12KΩ	.1Ω	320Ω
10	6V6GT	0Ω	0Ω	60KΩ	60KΩ	490Ω	60KΩ	.1Ω	320Ω
11	5Y3GT	INF.	60KΩ	INF.	90Ω	INF.	85Ω	INF.	60KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STROMBERG-CARLSON MODELS
1210M2-M, 1210M2-W, 1210M2-Y,
1210PGM, 1210PLM, 1210PGW PAGE 9





DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor plug from chassis.
3. Remove phono-pickup plug from chassis.
4. Remove speaker plug from chassis.
5. Remove cabinet lamp plug from chassis.
6. Remove loop antenna plug from chassis.
7. Remove FM dipole leads from chassis.
8. Remove four screws holding chassis in cabinet. Remove chassis from cabinet.
9. Remove four screws holding speaker in cabinet. Remove speaker from cabinet.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Output from sig. gen. should be no higher than necessary to obtain sufficient meter deflection.

Use insulated alignment screwdriver for all adjustments.

It is recommended that final IF alignment be made with FM sig. generator and scope in Steps 4, 5, 6 and 7; however, if this equipment is not available a final alignment may be made with AM generator and VTVM as in Steps 1, 2 and 3.

If either IF channels needs alignment then both should be done.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Use minimum output from sig. gen. in order to prevent over loading of limiter stage.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	100MMFD	High side to Point (A). Low side to chassis.	455KC (400∿ modulated)	AM	Tuning slugs fully in.	DC probe to Point (B). Common to chassis	A1,A2, A3,A4.	Adjust for maximum deflection on 3V DC scale.
2	100MMFD	"	10.7MC (400∿ modulated)	FM 1	"	DC probe to Point (C). Common to chassis	A5,A6, A7,A8, A9,A10	Detune A11 and adjust A5, A6, A7, A8, A9 & A10 for maximum output.
3	100MMFD	"	"	"	"	DC probe to Point (D). Common to chassis	A11	Adjust for zero deflection. If equipment is available make final adjustments of IF's with FM sig. gen. & scope as in Steps 4, 5, 6 and 7.

FINAL IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60∿ modulation. Use 120∿ sawtooth voltage in scope for horizontal deflection. Set sync. selector switch on scope for "EXT. SYNC". Couple the cathode of the rectifier tube of the receiver to the "EXT. SYNC" binding post of scope through a .1 MFD cap. Advance sync. control on scope just enough to synchronize pattern.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	100MMFD	High side to Point (A). Low side to chassis.	455KC (freq. modulation 30KC sweep 60∿ modulation.)	AM	Tuning slugs fully in.	Vertical input to Point (E). Ground to chassis.	A1,A2, A3,A4.	Adjust for maximum amplitude, symmetry and coincidence of pattern of Fig. 1.
5	100MMFD	High side to Pin 1 (grid) 6BA6. 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulation 300KC sweep 60∿ modulation)	FM 1	"	Vertical input in series with .01 MFD cap. to Point (E). Ground to chassis	A10,A8, A7.	Adjust for maximum amplitude, symmetry & coincidence of pattern of Fig. 2.
6	100MMFD	High side to Point (A). Low side to chassis.	"	"	"	"	A6,A5	"
7	100MMFD	"	"	"	"	Vertical input to Point (D). Ground to chassis.	A9,A11	Alternately adjust A10 for maximum amplitude, and A11 for maximum straightness of cross-over lines with cross-over occurring at center of pattern per Fig. 3.

AM RF ALIGNMENT

To set pointer turn tuning slugs fully out and set pointer to reference dot at extreme right hand end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	200MMFD	High side to ext. ant. terminal. Low side to chassis.	535KC (400∿ Amp modulated)	AM	Tuning slugs fully in.	DC probe to Point (F). Common to chassis	A12	Adjust for maximum deflection.
9	200MMFD	"	1700KC	"	Tuning slugs fully out.	"	A13	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made.
10	200MMFD	"	600KC	"	Tune for maximum deflection.	"	A14	Adjust for maximum deflection.
11	200MMFD	"	1500KC	"	"	"	A15	Adjust for maximum deflection. Repeat Steps 10 & 11 until no further improvement can be made.
12	200MMFD	"	600KC	"	"	"	A16	Adjust for maximum deflection.

FM RF ALIGNMENT

Check travel of pointers to see if it is equidistant either side of center scale setting. FM 1 Band must be aligned prior to alignment of FM 2.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
13	2 150Ω carbon res.	Each side in series with 150Ω to FM Dipole terminals.	100MC	FM 1	Channel 260	DC probe to Point (G). Common to chassis.	A17	Adjust for maximum deflection.
14	"	"	"	"	Tune for maximum deflection.	"	A18, A19	Adjust for maximum deflection.
15	"	"	46MC	FM 2	Channel 60	"	A20	Adjust for maximum deflection.
16	"	"	"	"	Tune for maximum deflection.	"	A21, A22	Adjust for maximum deflection.

FIG. 1

FIG. 2

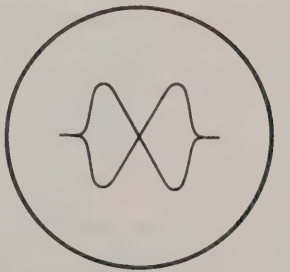
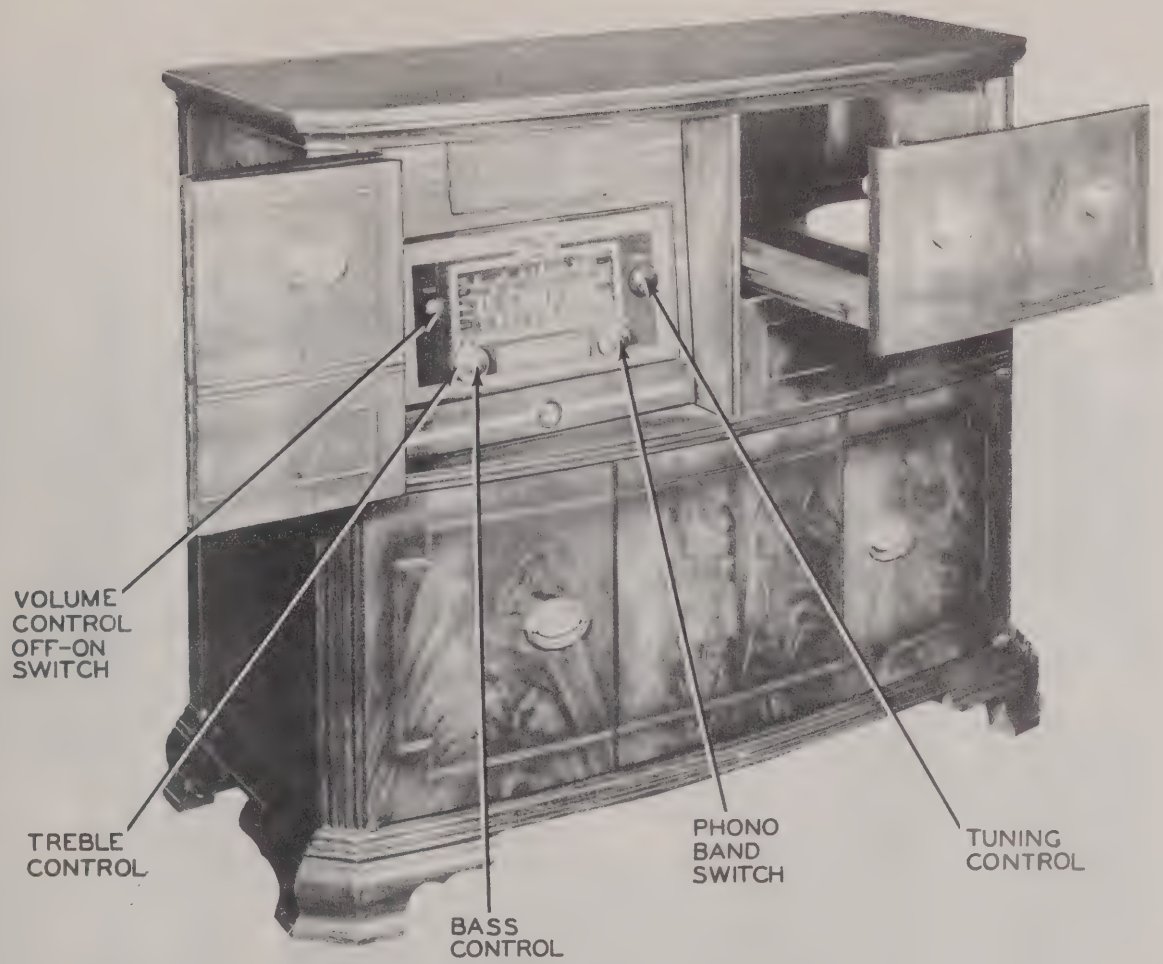


FIG. 3

WESTINGHOUSE MODEL
H-169 (Ch. V-2124-1)



WESTINGHOUSE MODEL
H-169 (Ch. V-2124-1)

WESTINGHOUSE MODEL H-169

TRADE NAME	Westinghouse, Model H-169 (Ch. V-2124-1)
MANUFACTURER	Westinghouse Electric Corp., Receiver Div., Sunbury, Pa.
TYPE SET	AC Operated Combination Phono-Radio Multi-Band AM-FM Superheterodyne Receiver
TUBES (FOURTEEN)	Types, 7F8 RF Amp., 7F8 Converter, 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6SH7 Limiter, 6H6 Ratio Det., 6H6 AM Det.-AVC, 6SC7 Phono Pre Amp., 6SQ7 1st AF Amp., 6U5/6G5 Tuning Eye, 6SN7GT Driver, (2) 6L6G Power Output, 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	1.4 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC SHORT WAVE 5-10MC, 11.2-22MC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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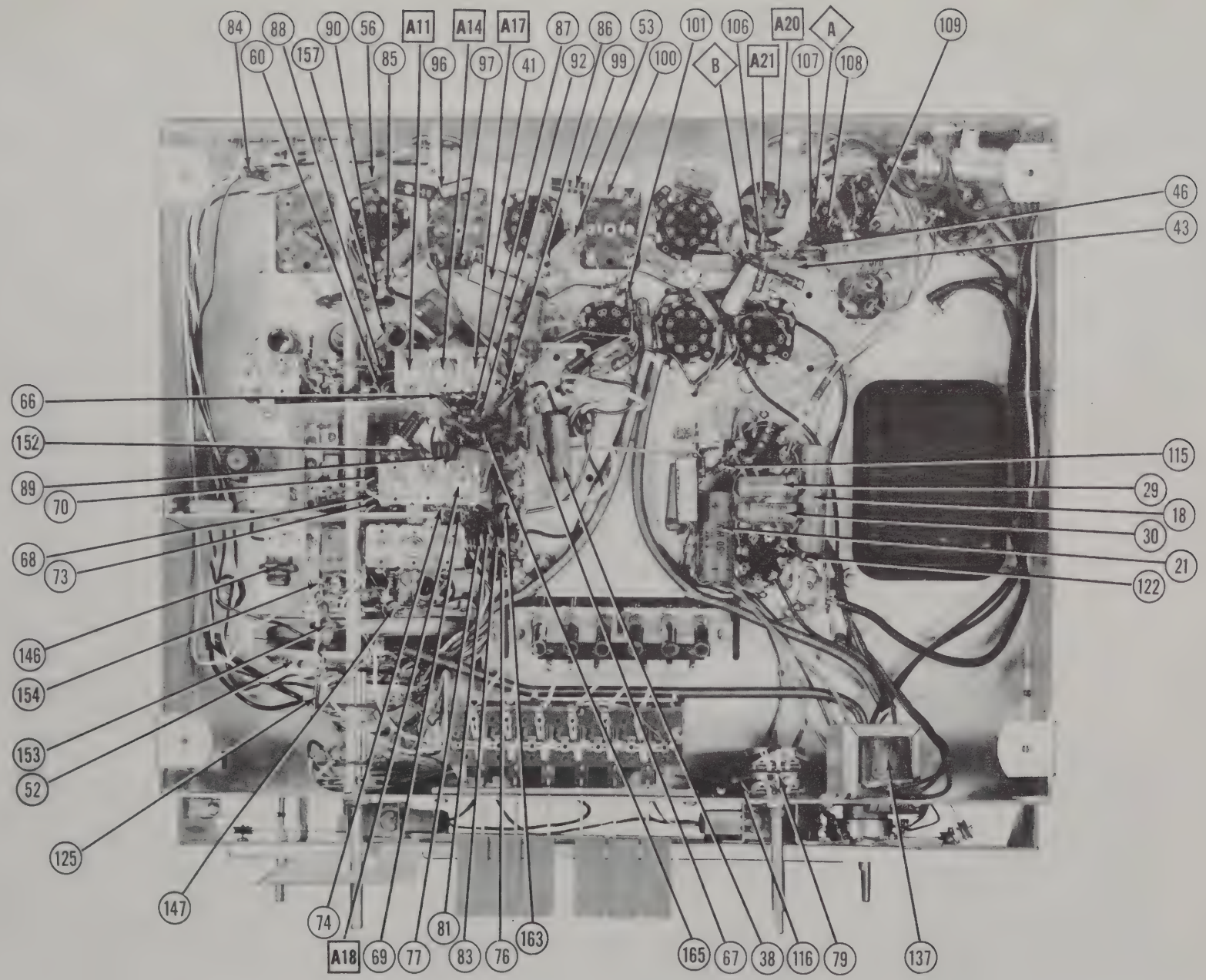
DATE 3/48-#487-24 SET #37-FOLDER #24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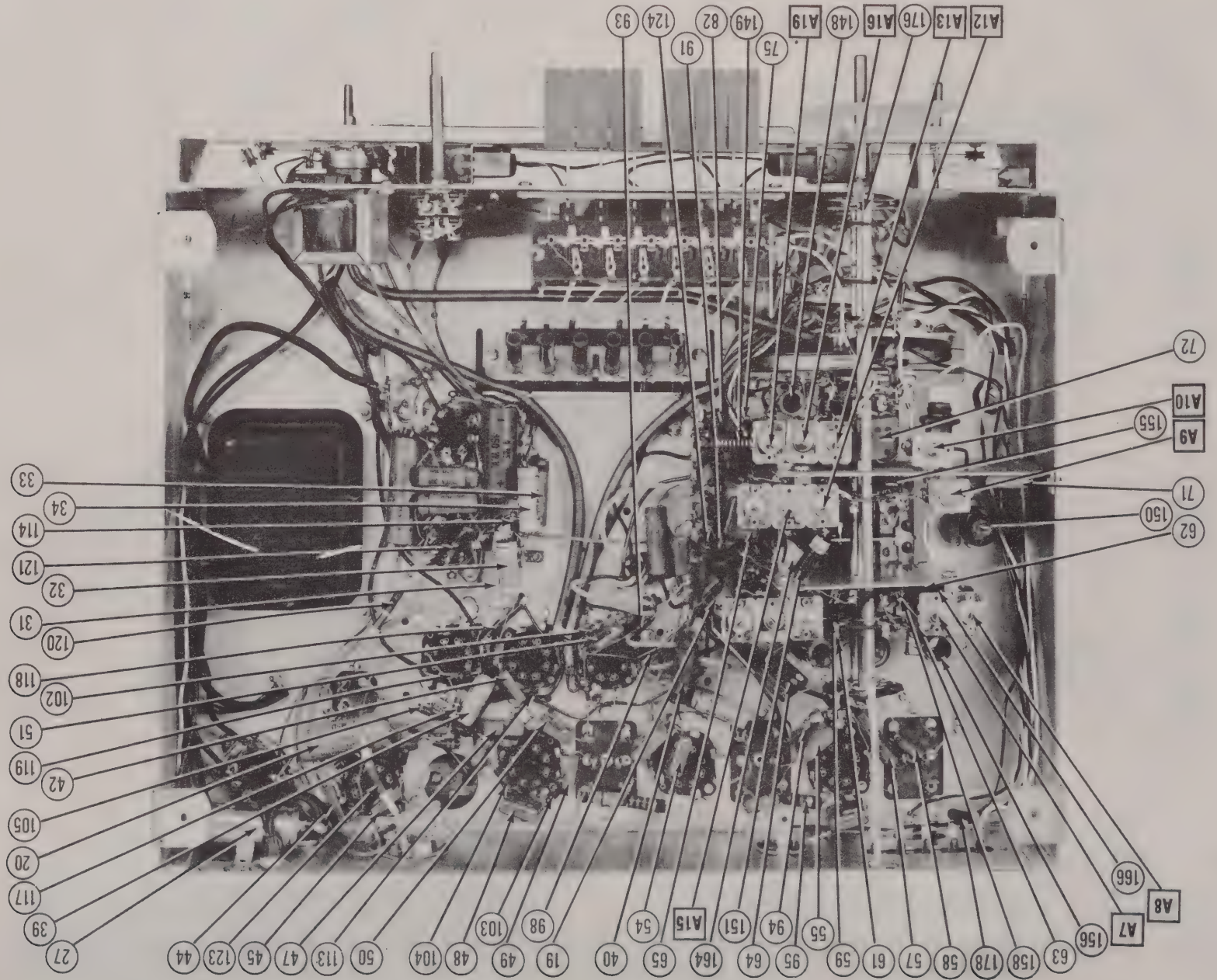
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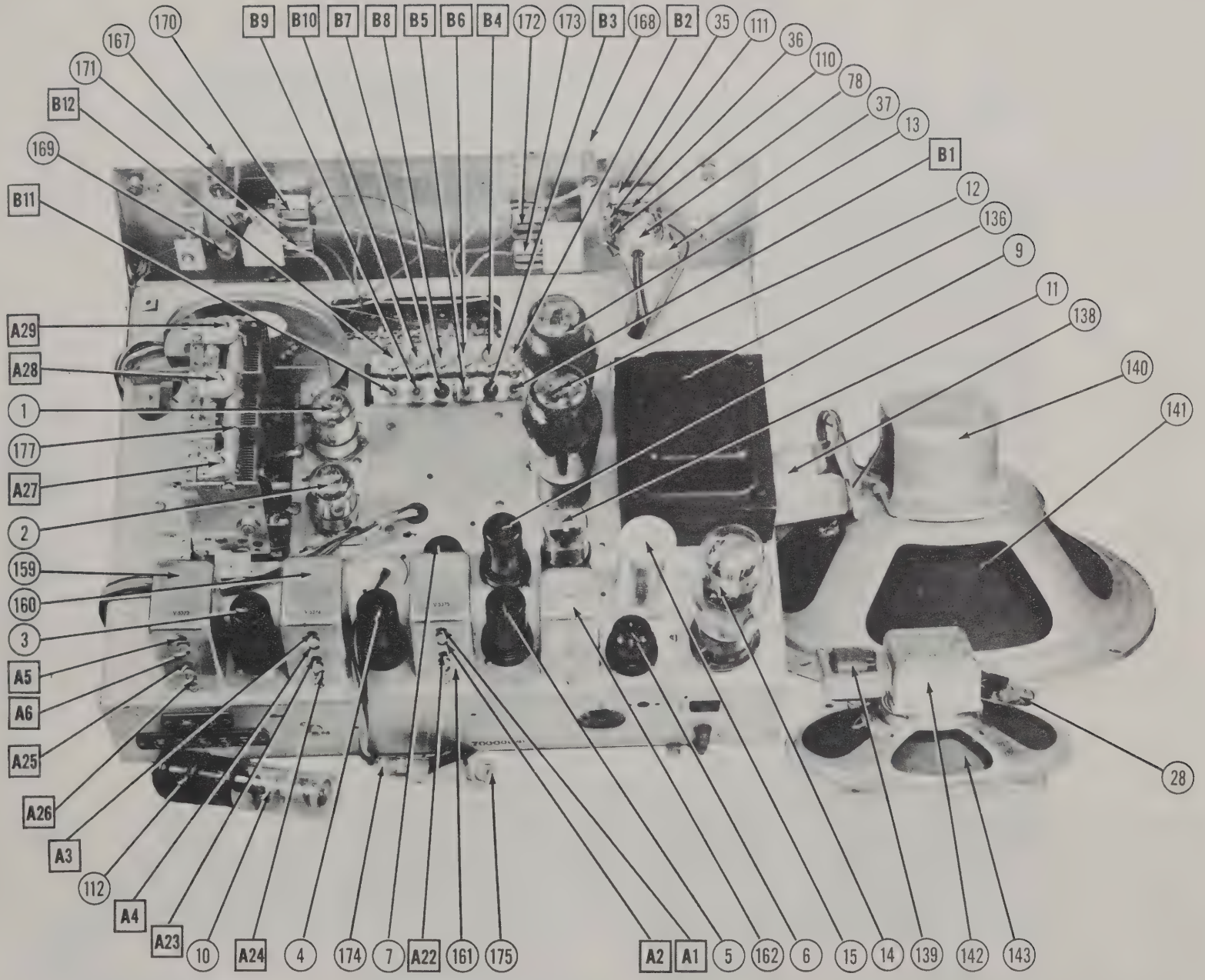
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A22
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7F8	7F8	8BW	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	6SG7	6SG7	8BK	
4	2nd IF Amp.	6SG7	6SG7	8BK	
5	Limiter	6SH7	6SH7	8BK	
6	Ratio Det.	6H6	6H6	7Q	
7	AM Det.-AVC	6H6	6H6	7Q	
8	Phono Pre-Amp.	6SC7	6SC7	8S	
9	1st AF Amp.	6SQ7	6SQ7	8Q	
10	Tuning Eye	6U5/6G5	6U5/6G5	6R	
11	Driver	6SN7GT	6SN7GT	8BD	
12	Power Output	6L6G	6L6G	7AC	
13	Power Output	6L6G	6L6G	7AC	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: WESTINGHOUSE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
15A	30	450	V-5115	EL-344		UP43145C*	DY-403	▲ Filter
B	10	450						■ "
C	30	450		UT-30				▲ "
16A	10	450	V-4928	EL-210		UP1145	DY-2x10-450	▲ Pre-Amp. Plate Decoup.
B	10	450						■ " " "
17	4	450	V-4885	UT-4	PRS450-4	BR445	M-4-450	Filter-See Note
18	20	25	V-5236	TA-25	PRS25-25	BR202A	M-25-25	Cathode Bypass
19	4	450	V-4885	UT-4	PRS450-4	BR445	M-4-450	Conv. Decoupling
20	2	450	V-5311	UT-4	PRS150-4	BR245	M-4-150	Stabilizing Cap.
21	4	450	V-4885	UT-4	PRS450-4	BR445	M-4-450	AF Plate Decoup.
22	.005	600	RCP10M6502A	TC-25	684-005	DT6D5	ST-6-005	Audio Coupling
23	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	" "
24	.005	600	RCP10M6502A	TC-25	684-005	DT6D5	ST-6-005	" "
25	.02	400	RCP10W4203A	TC-12	484-02	DT4S2	ST-4-02	" "
26	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	Tone Comp.
27A	.01	600	V-4634	TC-11	684-01	DT6S1	MPH-6-01	Line Filter
B	.01	600		TC-11	684-01	DT6S1	MPH-6-01	" "
28	.02	600	RCP10W4203A	TC-12	684-02	DT6S2	ST-6-02	Audio Coupling
29	.005	600	RCP10M6502A	TC-25	684-005	DT6D5	ST-6-005	Output Plate Bypass
30	.005	600	RCP10M6502A	TC-25	684-005	DT6D5	ST-6-005	" " "
31	.05	400	RCP10W4503A	TC-15	484-05	DT4S5	ST-4-05	Audio Coupling
32	.001	600	RCP10W6102A	TC-21	684-001	DT6D1	ST-6-001	Tone Compensation
33	.02	400	RCP10W4203A	TC-12	484-02	DT4S2	ST-4-02	" "
34	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	" "
35	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	" "
36	.002	600	RCP10W6202M	TC-22	684-002	DT6D2	ST-6-002	" "
37	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
38	.02	400	RCP10W4203A	TC-12	484-02	DT4S2	ST-4-02	AVC Filter
39	.001	600	RCP10W6102M	TC-21	684-001	DT6D1	ST-6-001	De-emphasis
40	.02	400	RCP10W4203A	TC-12	484-02	DT4S2	ST-4-02	AVC Filter
41	.01	400	RCP10W4103A	TC-11	484-01	DT4S1	ST-4-01	" "
42	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
43	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	AVC Filter
44	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	RF Bypass
45	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	" "
46	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Load Cap.
47	10000		RCM30B103M	TC-11	684-01	DT6S1	ST-6-01	Limiter Decoupling
48	4700		RCM30B472M	1FM-25	1467-005	1D5D5	MW.5-25	Limiter Screen Bypass
49	47		RCM20B470M	1FM-45	1468-00005	5W5Q5	MO.5-45	IF Coupling
50	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter
51	220		RCM20B221M	1FM-325	1468-00025	5W5T25	MO.5-325	" " "
52	27		RCM20B220M	MS-43	1468-000025	5W5Q3	MO.5-43	RF Bypass-Cer.
53	10000		RCM30B103M	TC-11	684-01	DT6S1	ST-6-01	2nd IF Decoupling
54	4700		RCM30B472M	1FM-25	1467-005	1D5D5	MW.5-25	2nd IF Screen Bypass
55	10000		RCM30B103M	TC-11	684-01	DT6S1	ST-6-01	1st IF Decoupling
56	4700		RCM30B472M	1FM-25	1467-005	1D5D5	MW.5-25	1st IF Screen Bypass
57	4700		R5CC36ZY472M	1FM-25	1467-005	1D5D5	MW.5-25	AVC Filter-Cer.
58	22		R2CC21PJ220K					Fixed Trimmer-Cer.
59	4700		R5CC36ZY472M	1FM-25	1467-005	1D5D5	MW.5-25	Conv. Cathode Bypass-Cer.
60	47		R2CC26RJ470K	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.-Cer.

DATE 3/48-#487-24 SET #37-FOLDER #24

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
113	2200Ω	½	RC10AE222K	BTS-2200	Red-Red-Red AF Cathode
114	100KΩ	½	RC10AE104K	BTS-100K	Br.-Blk.-Y1. AF Plate Load
115	270KΩ	½	RC10AE274K	BTS-270K	Red-V1.-Y1. AF Plate Decoupling
116	270KΩ	½	RC10AE274M	BTS-270K	Red-V1.-Y1. Tone Compensation
117	470Ω	½	RC20AE471K	BTS-470	Y1.-V1.-Br. Driver Cathode
118	1 Meg.	½	RC10AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Driver Grid
119	33KΩ	½	RC10AE33K	BTS-33K	Or.-Or.-Or.-Driver Transformer Shunt
120	190Ω	4	V-5134	ABA-200	Br.-White-Br. Output Cathode-See Note 3
121	33Ω	½	RC20AE330K	BW-½-33	Or.-Or.-Blk. Parasitic Suppressor
122	33Ω	½	RC20AE330K	BW-½-33	Or.-Or.-Blk. " "
123	290Ω	2.3	V-5340	ABA-300	Red-White-Br. Filter - See Note 4
124	150KΩ	½	RC10AE154K	BTS-150K	Br.-Grn.-Y1. Phono Amp. Voltage Dropping
125	1 Meg.	½	RC10AE105M	BTS-1 Meg.	BR.-Blk.-Grn. Tuning Indicator Grid - See Note 5
126	10KΩ	½		BTS-10K	Br.-Blk.-Or. Phono Shunt
127	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. 1st Phono Amp. Grid
128	68KΩ	½		BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Load
129	68KΩ	½		BTS-68K	Blue-Gray-Or. 1st Phono Amp. Plate Decoupling
130	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Decoupling
131	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd Phono Amp. Plate Load
132	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. 2nd Phono Amp. Grid
133	180KΩ	½		BTS-180K	Br.-Gray-Y1. Tone Compensation
134	10KΩ	½		BTS-10K	Br.-Blk.-Or. " "
135	100KΩ	½		BTS-100K	Br.-Blk.-Y1. " "

Note 1: Some Models use 2200Ω in this application. Replacement same as #113.
Note 2: Some Models use two 100KΩ resistors in series with the AM Audio Lead connected to the center replacement same as #84.
Note 3: On IRC replacement set slider at 190Ω from one end.
Note 4: On IRC replacement set slider at 290Ω from one end.
Note 5: Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: WESTINGHOUSE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
136	117V.AC @ 1.4A	700V.CT @ .200A	5.0V.AC @ 3.0A	6.4V.AC @ 6.3A	V-5137	P-8314 P-6134†	T22R07	P2955#

† Drill new mounting holes. (Filament transformer only)
# Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: TURNS RATIO PRI. to SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
137	2 to 1	840Ω CT	160Ω CT	V-5136	A-4712‡			‡Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: WESTING-HOUSE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
138	5500 CT	2.5Ω	320Ω CT	.3Ω	Part of V-5160	A-3830‡	T22S58‡	A-2905	‡Drill one new mounting hole.
139	8500Ω	3.4Ω	350Ω	.4Ω	Part of V-5161	A-3856§	T22S47§	A-2900§	§Bend mounting tabs down, file out slots and mount on original bracket.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	WESTING-HOUSE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
61	1000		R5CC26ZY102M	1FM-21	1467-001	1W5D1	MW.5-21	IF Coupling
62	2200		RCM30B222M					Fixed Trimmer
63	180		RCM20C181J					Osc. Feedback
64	3c00		RCM30B3d2J					Fixed Padder
65	10000		RCM30B103M	TC-11	684-01	DT6S1	ST-6-01	Filament Bypass
66	470		R5CC21ZY471M	1FM-35	1468-0005	5W5T5	MO.5-35	Osc. Plate Bypass-Cer.
67	10000		RCM30B103M	TC-11	684-01	DT6S1	ST-6-01	RF Bypass Pwr. Supply
68	200		R2CC36SL221M	1FM-32	1468-0002	5W5T2	MO.5-32	RF Coupling-Cer.
69	1.5		V-5362					" " - "
70	1.5		V-5362					" " - "
71	2700		RCM30B272H					Fixed Trimmer
72	2700		RCM30B272H					" "
73	22			MS-425	1468-000025	5W5Q25	MO.5-425	RF Coupling
74	470		R2CC36SL221M	1FM-35	1468-0005	5W5T5	MO.5-35	RF Plate Bypass
75	47		R2CC26PJ470K	1FM-45	1468-00005	5W5Q5	MO.5-45	RF Coupling-Cer.
76	470		R5CC21ZY471M	1FM-35	1468-0005	5W5T5	MO.5-35	RF Grid Bypass-Cer.
77	18		RCM20B180K					Fixed Trimmer-Cer.
178	100			1FM-31	1468-0001	5W5T1	MO.5-31	RF Coupling-Cer.-See Note

*Do not use bypass section.
Note-Not used in some models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	WESTING-HOUSE PART No.	IRC PART No.	CLAROSTAT PART No.	
78A	2 Meg.	½	V-5111	D13-139XX		Volume Control tapped @ 500K & 1 Meg.
B	Shaft		Not.Req.	A		Attach to 78A per instructions.
C	Switch		Not. Req.	41		" " " " "
79	1 Meg.-					
	2 Meg.	½	V-5130			Tone Control (Dual)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WESTING-HOUSE PART No.	IRC PART No.	
80	220Ω	½			Red-Red-Br. 2nd RF Cathode
81	6800Ω	½	RC20AE682K	BTS-6800	Blue-Gray-Red 2nd RF Plate Load
82	22KΩ	2	RC40AE223K	BT-2-22K	Red-Red-Or. 1st RF Plate Load
83	470KΩ	½	RC10AE474M	BTS-470K	Yl.-Vi.-Yl. 1st RF Grid
84	100KΩ	½	RC10AE104K	BTS-100K	Br.-Blk.-Yl. Antenna Loading - See Note 1
85	68Ω	½	RC10AE680M		Blue-Gray-Blk. Parasitic Suppressor
86	1 Meg.	½	RC10AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
87	39KΩ	½	RC20AE393K	BTS-39K	Or.-White-Or. Converter Plate Load
88	470Ω	½	RC20AE471K	BTS-470	Yl.-Vi.-Br.- Converter Cathode
89	1000Ω	½	RC10AE102M	BTS-1000	BR.-Blk.-Red Parasitic Suppressor
90	1 Meg.	½	RC10AE105M	BTS-1 Meg.	Br.-Blk.-Grn. 1st IF Transformer Shunt
91	6800Ω	2	RC40AE682K	BT-2-6800	Blue-Gray-Red Oscillator Plate
92	22KΩ	½	RC10AE223K	BTS-22K	Red-Red-Or. Oscillator Grid
93	2.2 Meg.	½	RC10AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
94	270KΩ	½	RC10AE274M	BTS-270K	Red-Vi.-Yl. " "
95	33KΩ	1	RC30AE333K	BTA-33K	Or.-Or.-Or. 1st IF Screen Dropping
96	3300Ω	1	RC30AE332K	BTA-3300	Or.-Or.-Red 1st IF Decoupling
97	1 Meg.	½	RC10AE105M	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
98	1 Meg.	½	RC10AE105M	BTS-1 Meg.	BR.-Blk.-Grn. " "
99	33KΩ	1	RC30AE333K	BTA-33K	Or.-Or.-Or. 2nd IF Screen Dropping
100	3300Ω	1	RC30AE332K	BTA-3300	Or.-Or.-Red 2nd IF Decoupling
101	47KΩ	½	RC10AE473M	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
102	220KΩ	½		BTS-220K	Red-Red-Yl. Diode Load - See Note 2
103	100KΩ	½	RC10AE104K	BTS-100K	Br.-Blk.-Yl. Limiter Grid
104	270KΩ	½	RC10AE274K	BTS-270K	Red-Vi.-Yl. Limiter Screen Dropping
105	10KΩ	½	RC20AE103K	BTS-10K	Br.-Blk.-Or. Limiter Decoupling
106	68KΩ	½	RC10AE683M	BTS-68K	Blue-Gray-Or. De-emphasis
107	2.2 Meg.	½	RC10AE225M	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
108	15KΩ	½	RC10AE153J	BTS-15K	Br.-Grn.-Or. Ratio Detector Diode Load
109	15KΩ	½	RC10AE153J	BTS-15K	Br.-Grn.-Or. " " " "
110	270KΩ	½	RC10AE274M	BTS-270K	Red-Vi.-Yl. Tone Compensation
111	27KΩ	½	RC10AE273M	BTS-27K	Red-Vi.-Or. " "
112	1 Meg.	½	RC10AE105M	BTS-1 Meg.	Br.-Blk.-Grn. Tuning Indicator Plate Load

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			WESTINGHOUSE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
140	550Ω	2.5Ω	V-5160		12E60**	**Replace output transformer to match 6-8ΩVC.
	CONE DIA.	VC DIA.				
141	11½ in.	1¼ in.				
	FIELD	VC IMP.				
142	PM.	3.4Ω	V-5101			
	CONE DIA.	VC DIA.				
143	4-7/8"x7"	11/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	WESTING-HOUSE PART No.	MEISSNER PART No.	
144	Loop Ant.		.1Ω	V-3283-4		
145	FM Ant.		1NF	V-4777-1		
146	BC Ant.Coil		2Ω	V-5129		
147	SW Ant.Coil	0Ω	0Ω	V-5125		
148	SW Ant.Coil	0Ω	.2Ω	V-5147		
149	FM Ant.Coil		0Ω	V-5261		
150	BC RF Coil		2.2Ω	V-5149		
151	SW RF Coil		0Ω	V-5126		
152	SW RF Coil		0Ω	V-5148		
153	PB Ant.Coil		1.8Ω	V-5128		
154	FM " Coil		0Ω	V-5140		
155	FM RF Coil		0Ω	V-5122		
156	BC OSC Coil		9.2Ω	V-5127	14-1040	
157A	SW OSC Coil		0Ω	V-5124		
B	SW OSC Coil		0Ω			
158	FM OSC Coil		0Ω	V-5121		
159A	AM InputIF	1NF	6.2Ω	V-5373		
B	FM InputIF					
160A	AM InterIF					
B	FM InterIF	6.1Ω	6.5Ω	V-5374		
161A	AM OutputIF	8Ω	8Ω	V-5375		
B	FM OutputIF	1.2Ω				
162	Dis.Trans.	.5Ω	.1Ω	V-5212		
163	Fil. Choke		0Ω	V-4638		
164	Fil. Choke		1Ω	V-4886		
165	Fil. Choke		1Ω	V-4886		
166	Cathode Choke		3.2Ω	V-3313		

DIAL LIGHT

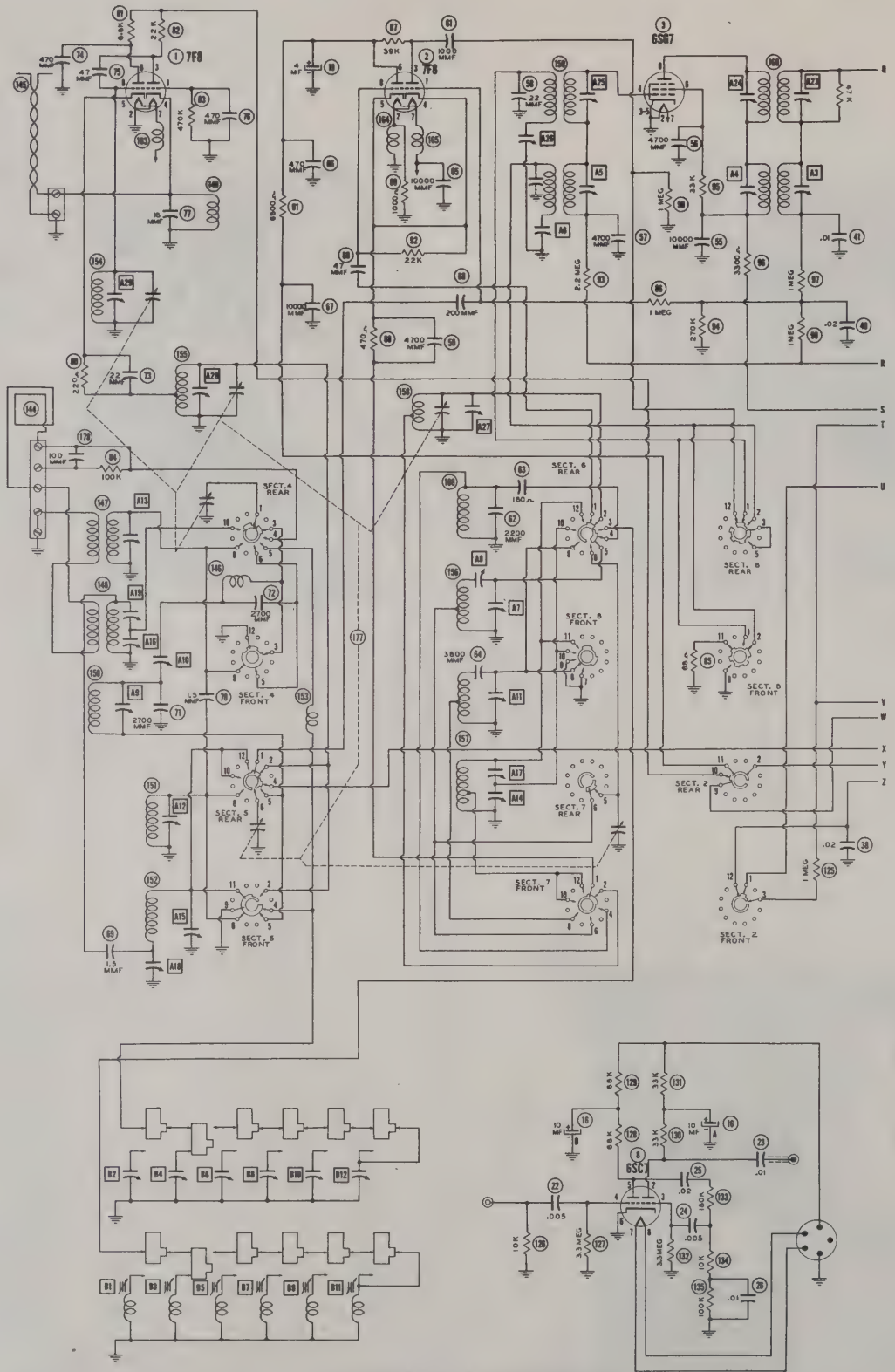
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					WESTING-HOUSE PART No.		
167-168	Bayonet	6-8	0.25	Blue	No. 44		Type 44
169-175	"	7-5	0.2	White	No. 51		Type 51

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
176	Switch	V-5135	Band-Phono
177	3 Gang Var.Cap.	V-3296	(15-473 MMF) each section
A7, A8	2 Gang Trimmer	V-5143	A7 BC OSC. ADJ. A8 BC OSC. Pad.
A9	Trimmer	V-5208	BC RF ADJ.
A10	Trimmer	V-5159	BC Ant. ADJ.
	Trimmer	V-5221	A11,A14,A17
	Trimmer	V-5220	A12,A15,A18
	Trimmer	V-5219	A13,A16,A19
	Trimmer	V-3713-1	A27,A28,A29

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor and phono-pickup plug from under record changer.
3. Remove FM antenna leads from terminal strip on back of chassis.
4. Remove loop leads from terminal strip on back of chassis.
5. Disconnect phono-pre-amp. power supply plug.
6. Remove phono power plug from tuning chassis.
7. Remove two wood screws holding phono-pre-amp. chassis in cabinet. Remove chassis from cabinet.
8. Remove tuning eye from bracket under chassis mounting board.
9. Remove speaker plug from small speaker.
10. Remove speaker plug from chassis.
11. Remove light socket from phono-compartment.
12. Remove light from bottom of cabinet.
13. Remove four hex head bolts holding chassis in cabinet. Remove chassis from cabinet.
14. Remove four wood screws holding small speaker in cabinet. Remove speaker from cabinet.
15. Remove four wood screws holding large speaker in cabinet. Remove speaker from cabinet.



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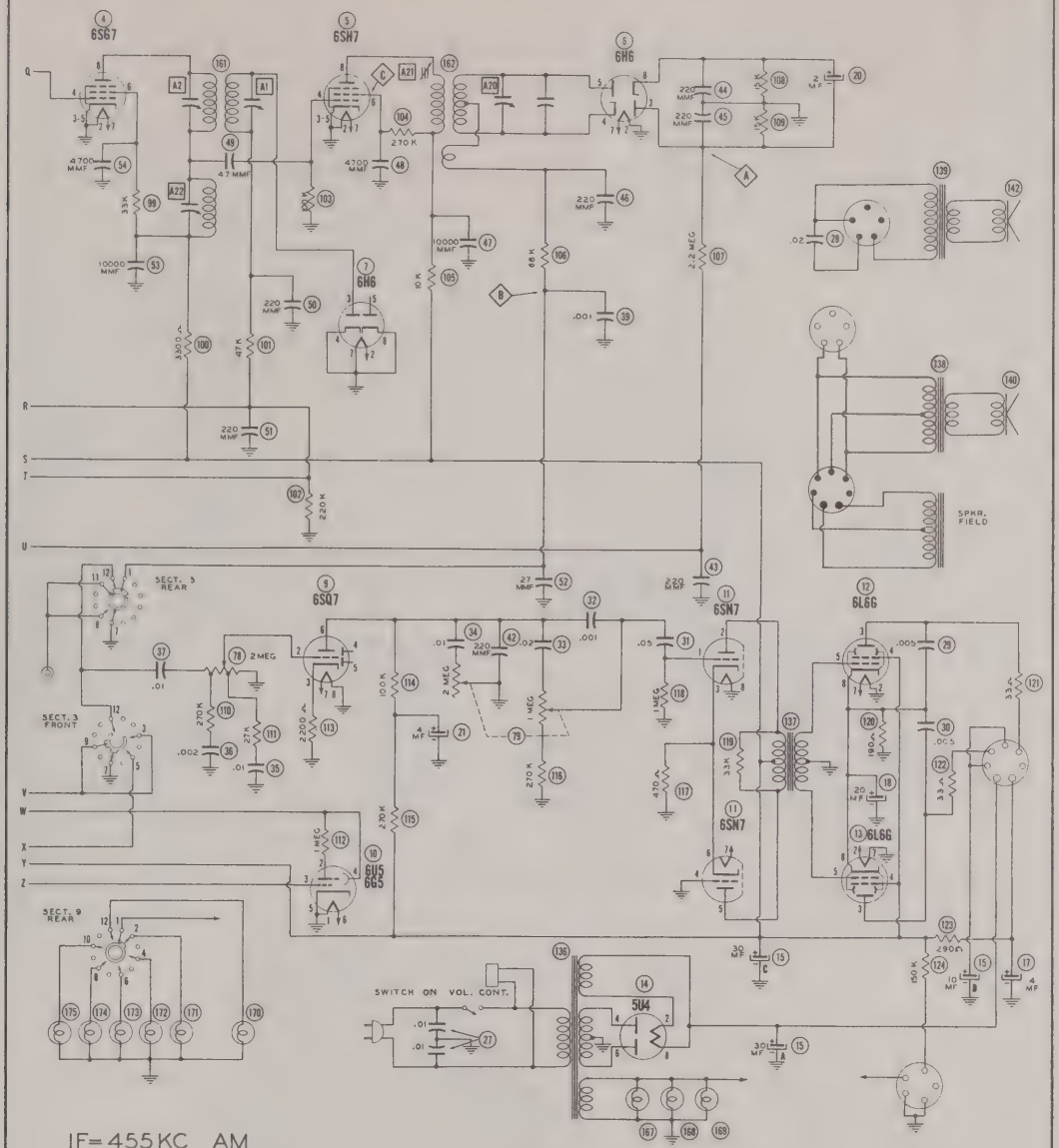

STAGE GAIN MEASUREMENTS

CONVERTER GAIN	[illegible]	[illegible]
INPUT IF TRANSFORMER	[illegible]	[illegible]
1st IF TUBE	[illegible]	[illegible]
INTER. IF TRANSFORMER	[illegible]	[illegible]
2nd IF TUBE	[illegible]	[illegible]
OUTPUT IF TRANSFORMER	[illegible]	[illegible]
1st AUDIO	[illegible]	[illegible]
PHASE INVERTER	[illegible]	[illegible]
DRIVER TRANSFORMER	[illegible]	[illegible]
OUTPUT	[illegible]	[illegible]
PRE-AMP 1st AUDIO	[illegible]	[illegible]
PRE-AMP 2nd AUDIO	[illegible]	[illegible]

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 4 (grid) 6SG7 2nd IF Tube (4). Low side to chassis.	455KC	BC	Tuning cap. fully closed	Across voice coil	A1,A2	Adjust for maximum output
2	.1 MFD.	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	"	"	"	"	A3,A4	" " " "
3	.1 MFD.	High side to Pin 1 (grid) 7F8. Low side to chassis.	"	"	"	"	A5,A6	" " " "
4	.1 MFD.	"	"	"	"	"	A1,A2, A3,A4, A5,A6.	" " " "
5	200MMFD	High side to BC Ant. terminal. Low side to chassis.	1500KC	"	1500KC	"	A7	" " " "
6	200MMFD	"	600KC	"	Tune for maximum output.	"	A8	Rock tuning cap. and adjust for maximum output. Repeat Steps 5 & 6 until no further improvement can be made.
7		Connect loop to "L" terminals. Use radiation loop.	1400KC	"	"	"	A9,A10	Adjust for maximum output.
8	400Ω carbon res	High side to center terminal of ant. terminal board marked "L". Low side to chassis.	10MC	SW 1	10MC	"	A11	Adjust for maximum output. Tune sig. gen. to 10.91MC. IF signal is not heard retune sig. gen. to 10MC. Open A11 to next peak and recheck for image.
9	"	"	9MC	"	Tune for maximum output.	"	A12, A13	Rock tuning cap. and adjust for maximum output.
10	"	"	20MC	SW 2	20MC	"	A14	Adjust for maximum output. Check for image as in Step 8 tuning sig. gen. to 20.91MC.
11	"	"	18MC	"	Tune for maximum output.	"	A15,A16	Rock tuning cap. and adjust for maximum output.
12	"	"	12MC	"	12MC	"	A17	Adjust for maximum output
13	"	"	"	"	Tune for maximum output.	"	A18, A19	Rock tuning cap. and adjust for maximum output. Repeat Steps 10 through 13 until no further improvement can be made.

FIG. 1

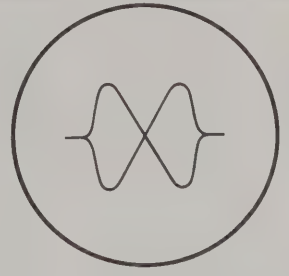


FIG. 2

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Do not attempt FM-IF alignment until AM-IF alignment has been completed.
IF a VTVM is not available a 20,000Ω per volt meter may be used.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
14	.001 MFD	High side to Pin 4 (grid) 6SH7. Low side to chassis.	10.7MC (unmodulated)	FM	Tuning cap. fully closed	DC probe to Point ◇B. Common to chassis.	A20	Adjust for zero deflection.
15	.001 MFD	"	"	"	"	DC probe to Point ◇A. Common to chassis.	A21	Adjust for maximum deflection. Repeat Steps 14 & 15 until no further improvement can be made.
16	.001 MFD	High side to Pin 4 (grid) 6SG7 2nd IF Tube (4). Low side to chassis.	"	"	"	"	A22	Adjust for maximum deflection.
17	.001 MFD	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	"	"	"	"	A23, A24.	" "
18	.001 MFD	High side to Pin 1 (grid) 7F8 FM Converter Tube (2). Low side to chassis.	"	"	"	"	A25, A26	Adjust for maximum deflection. Repeak A22, A23, A24, A25 & A26.
19	Repeat Step 14. Continue with FM RF Alignment Step 20.							

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Do not attempt FM-IF alignment until AM-IF alignment has been completed.
Use frequency modulated signal with 450KC sweep and 60∿ modulation. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
14	.001MFD	High side to Pin 4 (grid) 6SG7 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulated)	FM	Tuning cap. fully closed	Vertical input in series with .1 MFD. to Point ◇. Ground to chassis.	A22, A23, A24.	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
15	.001MFD	High side to Pin 1 (grid) 7F8 FM Converter Tube (2). Low side to chassis.	"	"	"	"	A25, A26	"
16	.001MFD	"	"	"	"	Vertical input to Point ◇B. Ground to chassis.	A21, A20	Alternately adjust A21 for max. amplitude and A20 for max. straightness of crossover lines with crossover occurring at center of pattern. Continue with FM RF Alignment Step 20.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
20	72Ω carbon resistor	High side to ungrounded FM Ant. terminal. Low side to chassis.	105MC	FM	105MC	DC probe to Point ◇A. Common to chassis	A27	Adjust for maximum deflection. This adjustment is critical as oscillation will occur if A27 is set above correct frequency.
21	"	"	"	"	Tune for maximum deflection.	"	A28,A29	Adjust for maximum deflection while rocking tuning cap. Repeat Steps 20 and 21.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RADIO-PHONO SWITCH IN PHONO POSITION.

VOLTAGE READINGS

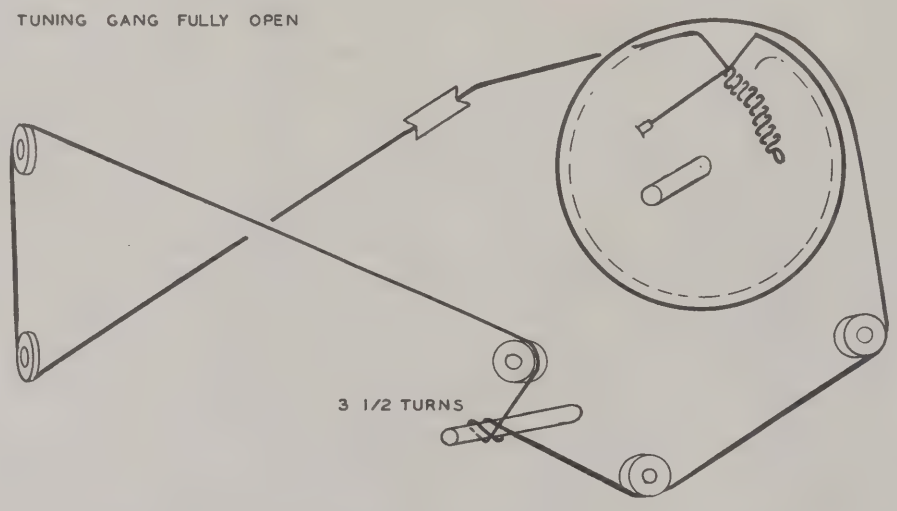
	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7F8	-.4VDC	0V.	130VDC	0V.	1.7VDC	237VDC	6.4VAC	0V.
	2	7F8	-.05VDC	0V.	219VDC	4.8VDC	4.8VDC	240VDC	6.2VDC	-11VDC§
	3	6SG7	0V.	0V.	0V.	-.8VDC	0V.	122VDC	6.4VAC	252VDC
	4	6SG7	0V.	0V.	0V.	-.7VDC	0V.	120VDC	6.4VAC	260VDC
‡	5	6SH7	0V.	0V.	0V.	-.3VDC	0V.	44VDC	6.4VAC	250VDC
‡	6	6H6	0V.	0V.	-.7VDC	.05VDC	.1VDC	0V.	6.4VAC	.7VDC
	7	6H6	0V.	6.4VAC	-.5VDC	0V.	0V.	-.4VDC	0V.	0V.
#	8	6SC7	0V.	77VDC	-.5VDC	-.5VDC	65VDC	0V.	0V.	6.4VAC
	9	6SQ7	0V.	0V.	1VDC	0V.	0V.	125VDC	6.4VAC	0V.
	10	6U5/6G5	6.4VAC	24VDC	-.6VDC	310VDC	0V.	0V.	-	-
	11	6SN7GT	0V.	300VDC	10VDC	0V.	300VDC	10VDC	6.4VAC	0V.
	12	6L6G	0V.	0V.	350VDC	300VDC	0V.	350VDC	6.4VAC	21VDC
	13	6L6G	0V.	6.4VAC	350VDC	300VDC	0V.	0V.	0V.	21VDC
	14	5U4G	0V.	390VDC	0V.	350VAC	0V.	350VAC	0V.	390VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	7F8	470KΩ	0Ω	72KΩ	0Ω	200Ω	58KΩ	.1Ω	0Ω
	2	7F8	1.2 Meg.	1Ω	95KΩ	480Ω	480Ω	55KΩ	1Ω	22KΩ
	3	6SG7	0Ω	0Ω	0Ω	2.2 Meg.	0Ω	86KΩ	.1Ω	53KΩ
	4	6SG7	0Ω	0Ω	0Ω	1.2 Meg.	0Ω	86KΩ	.1Ω	53KΩ
‡	5	6SH7	0Ω	0Ω	0Ω	100KΩ	0Ω	330KΩ	.1Ω	60KΩ
‡	6	6H6	0Ω	0Ω	15KΩ	INF.	INF.	0Ω	.1Ω	15KΩ
	7	6H6	0Ω	.1Ω	200KΩ	0Ω	0Ω	175KΩ	0Ω	0Ω
#	8	6SC7	0Ω	115KΩ	3 Meg.	3 Meg.	175KΩ	0Ω	0Ω	.1Ω
	9	6SQ7	0Ω	2 Meg.	2KΩ	0Ω	0Ω	420KΩ	.1Ω	0Ω
	10	6U5/6G5	.1Ω	1.2 Meg.	1.1 Meg.	50KΩ	0Ω	0Ω	-	-
	11	6SN7GT	1 Meg.	50KΩ	480Ω	0Ω	50KΩ	480Ω	.1Ω	0Ω
	12	6L6G	0Ω	0Ω	50KΩ	50KΩ	70Ω	60KΩ	.1Ω	190Ω
	13	6L6G	0Ω	.1Ω	50KΩ	50KΩ	80Ω	INF.	0Ω	140Ω
	14	5U4G	INF.	50KΩ	INF.	42Ω	INF.	46Ω	INF.	50KΩ

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DIAL CORD DRIVE

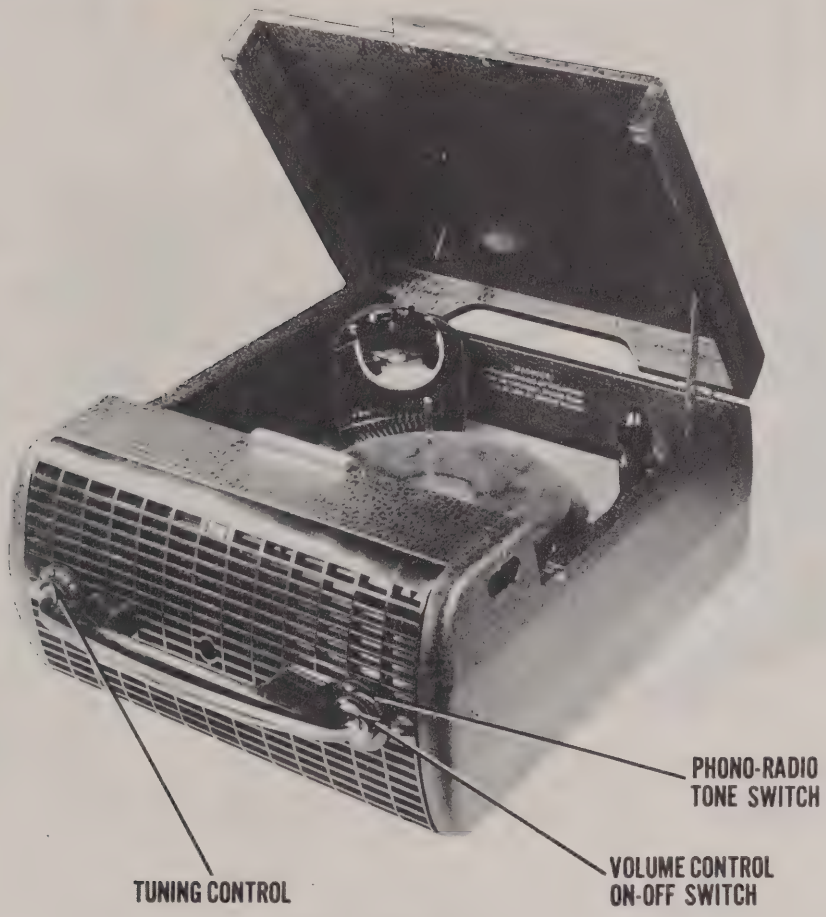
PUSHBUTTON ALIGNMENT

Range of pushbuttons reading from left to right (facing front of receiver) is: 530-900KC, 530-900KC, 530-900KC, 900-1600KC, 900-1600KC and 900-1600KC.

Make a list of stations desired to be set up, ranging from low to high frequency stations making certain each station falls within range of its button, and proceed as follows:

1. Turn receiver on and allow it to warm up for at least 15 minutes.
2. Manually tune in first station on list, turn bandswitch to pushbutton position and push in first button on left.
3. Adjust B_1 to tune in station.
4. Adjust B_2 for maximum volume.
5. To set up the remaining buttons follow the same procedure outlined above.

ZENITH MODEL
7RO7O (Ch. 6CO6)



ZENITH MODEL
7RO7O (Ch. 6CO6)

ZENITH MODEL 7RO7O

TRADE NAME	Zenith, Model 7RO7O (Ch. 6CO6)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SA7 Converter, 7R7 IF Det., 7F7 Phono Osc., 6SC7 AF-Phase Inv., (2) 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .43 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.5 MFD.	High side to front stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1600KC	Tuning cap. fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

ZENITH MODEL 7R670

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		ZENITH PART No.	STANDARD REPLACEMENT		
1	Converter	6SA7	6SA7	8R	
2	IF-Det.	7R7	7R7	8AE	
3	Phono Osc.	7F7	7F7	8AC	
4	AF-Phase Inv.	6SC7	6SC7	8S	
5	Power Output	25L6GT	25L6GT	7AC	
6	" "	25L6GT	25L6GT	7AC	
7	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ZENITH PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
8A	40	150	22-1381	EL-340		UP44415	DY-3X40-150	■ Filter
B	40	150		"				▲ Filter
C	40	150						Filter
9	40	150	22-1610	EL-14	AF8D	UP4025	DY-40-150	Filter
10	.05	400	22-1017	TC-15	484-05	DT4S5	ST-4-05	Line Filter
11	.03	400	22-1049	TC-13	484-03	DT4S3	ST-6-03	Output Plate Bypass
12	.01	600	22-196	TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
13	.01	600	22-196	TC-11	684-01	DT6S1	ST-6-01	Audio Coupling
14	.004	600	22-448	TC-24	684-004	DT6D4	ST-6-004	Audio Coupling
15	.004	600	22-448	TC-24	684-004	DT6D4	ST-6-004	Audio Coupling
16	.003	400	22-326	TC-23	484-003	DT6D3	ST-6-003	Tone Comp.
17	.02	200	22-327	TC-12	484-02	DT2S2	ST-4-02	Tone Comp.
18	.02	400	22-188	TC-12	484-02	DT4S2	ST-4-02	Audio Coupling
19	.05	200	22-829	TC-15	484-05	DT2S5	ST-4-05	Phono Isolation
20	.05	200	22-829	TC-15	484-05	DT2S5	ST-4-05	Phono Osc. Grid
21	.004	600	22-448	TC-24	684-004	DT6D4	ST-6-004	Audio Coupling
22	.1	200	22-827	TC-1	484-.1	DT2P1	ST-2-1	Line Isolation
23	.05	200	22-829	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
24	.05	400	22-1570	TC-15	484-05	DT4S5	5-4-05	Phono Amp. Bypass
25	350	600	22-954	IFM-325	1468-00035	5W5T3	MO.5-33	AF Plate Bypass
26	200	600	22-953	IFM-32	1468-0002	5W5T2	MO.5-32	Tone Comp.
27	50	500	22-1532	IFM-45	1468-00005	5W5Q5	MO.5-45	Fixed Trimmer
28	20	500	22-1673	MS-42		5W5Q2	MO.5-42	Fixed Trimmer
29	100	600	22-162	IFM-31	1468-0001	5W5T1	MO.5-31	RF Bypass

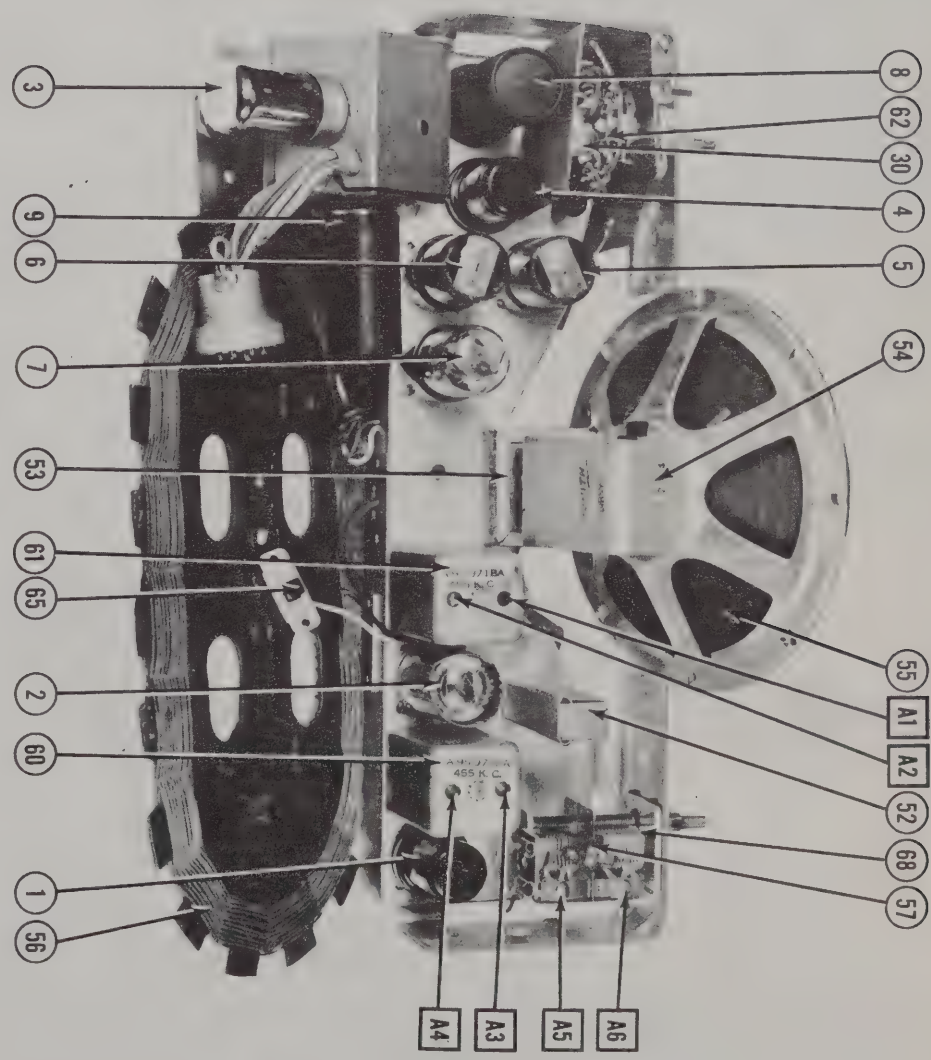
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	
30	500KΩ	½	63-1474			Volume Control & Sw.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
31	1000Ω	½	63-583	BTS-1000	Br.-Blk .-Red Parasitic Suppressor
32	10KΩ	½	63-589	BTS-10K	Br.-Blk.-Or. Oscillator Grid
33	15 Meg.	½	63-976	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
34	2.2 Meg.	½	63-600	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
35	15 Meg.	½	63-976	BTS-15 Meg.	Br.-Grn.-Blue. AF Grid
36	470KΩ	½	63-597	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
37	470KΩ.	½	63-597	BTS-470K	Yl.-Vi.-Yl. Phase Inverter Plate Load
38	15 Meg.	½	63-976	BTS-15 Meg.	Br.- Grn.-Blue Phase Inverter Grid
39	15KΩ	½	63-311	BTS-15K	Br.-Grn.-Or. Tone Compensation
40	390KΩ	½	63-658	BTS-390K	Or.-White-Yl. Output Grid
41	10K	½	63-589	BTS-10K	Br.-Blk.-Or. Output Grid
42	470KΩ	½	63-597	BTS-470K	Yl.-Vi.-Yl. Output Grid
43	140Ω	2.5	63-1366	ABA-150	Output Cathode - See Note 1

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
44	1.0Ω	2	63-1475	BW-2-100	Br.-Blk.-Br. Filter
45	680Ω	2	63-1070	BT-2-680	Blue-Gray-Br. Filter
46	47.0KΩ	½	63-597	BTS-470K	Yl.-Vi.-Yl. Phono Oscillator Grid
47	47KΩ	½	63-648	BTS-47K	Yl.-Vi.-Or. Phono Oscillator Plate Load
48	15 Meg.	½	63-976	BTS-15 Meg.	Br.-Grn.-Blue Phono Detector Grid
49	470KΩ	½	63-597	BTS-470K	Yl.-Vi.-Yl. Phono Detector Plate Load
50	15KΩ	½	63-311	BTS-15K	Br.-Grn.-Or. Phono Osc. Plate Load
51	22KΩ	½	63-591	BTS-22K	Red-Red-Or. Decoupling
52A	22kΩ	1	63-1511	BW-1-22	Rectifier Ballast
B	60Ω	7		ABA-75	Fil. Dropping - See Note 2
53	10 Meg.	½	63-604	BTS-10 Meg.	Br.-Blk.-Blue Contact Filter

Note 1 - On IRC replacement set slider @ 140Ω from one end.
Note 2 - On IRC replacement set slider @ 60Ω from one end.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
53	5600Ω CT	3.4Ω	290Ω CT	.4Ω	Part of 49-559	A-3823	T22887	A-2901	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ZENITH PART No.	JENSEN PART No.	QUAM PART No.	
54	FIELD	VC IMP.	49-556	ST-109 Mod. P6-W	6A21	
	PM	3.4Ω				
55	CONE DIA.	VC DIA.				
	6"	3/4"				

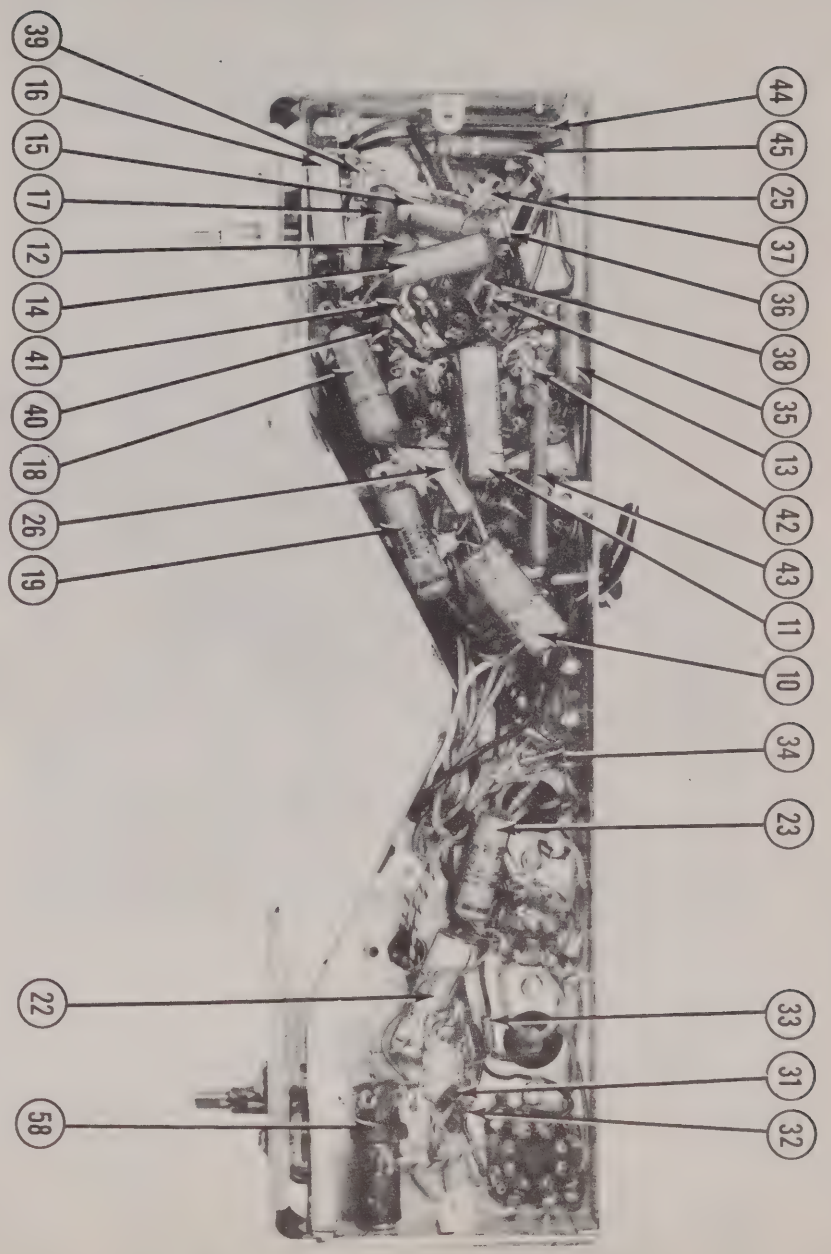
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	
56	Loop Ant.		.9Ω	S12740		
57	Ant. Load. Coil		.2Ω	S12389		
58	Osc. Coil	.5Ω	8Ω	S12733	14-1060*	*Add 50 MMFD. from Osc. grid to high side tuning cap.
59	Phono Osc. Coil		2.2Ω	S14605		
60	Input IF	14Ω	8.8Ω	95-970	16-6650	
61	Output IF	27.2Ω		95-971	16-6670	

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
62	Switch	85-388	Radio-Phono-Tone
64	Switch	85-372	Off-Man.-Auto.
65	Switch	85-389	Reject
66	Solenoid	S11458	
67	Trip contact	S12575	
68	2 Gang Var.Cap.	22-1541	(21-380 MMF,19-110 MMF)

CHASSIS—BOTTOM VIEW



‡VOLTAGE AND RESISTANCE READINGS TAKEN IN PHONO POSITION. PICK-UP DISCONNECTED.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	24VAC	100VDC	100VDC	-6VDC§	0V.	19VAC	-.5VDC
2	7R7	11VAC	100VDC	-.4VDC	0V.	100VDC	-.5VDC	0V.	19VAC
‡ 3	7F7	0V.	0V.	38VDC	-.6VDC	-.8VDC§	63VDC	0V.	6.5VAC
4	6SC7	0V.	50VDC	-.4VDC	-.4VDC	50VDC	0V.	11VAC	6.5VAC
5	25L6GT	0V.	24VAC	114VDC	116VDC	0V.	0V.	50VAC	10VDC
6	25L6GT	0V.	75VAC	114VDC	116VDC	0V.	0V.	50VAC	10VDC
7	25Z6GT	0V.	100VAC	117VAC	124VDC	117VAC	0V.	75VAC	124VDC

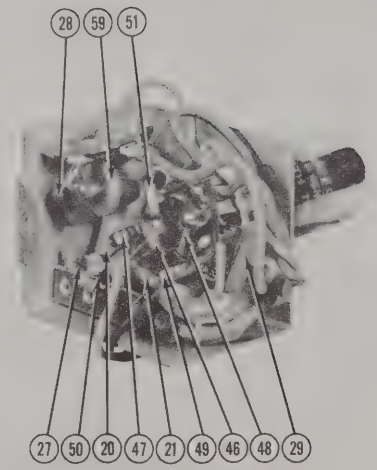
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	INF.	15Ω	300KΩ	300KΩ	10KΩ	.5Ω	11Ω	2.7 Meg.
2	7R7	8Ω	300KΩ	500KΩ	0Ω	300KΩ	2.7 Meg.	0Ω	11Ω
‡ 3	7F7	0Ω	0Ω	790KΩ	15 Meg.	470KΩ	390KΩ	0Ω	3Ω
4	6SC7	INF.	770KΩ	15 Meg.	15 Meg.	770KΩ	0Ω	8Ω	3Ω
5	25L6GT	INF.	15Ω	300KΩ	300KΩ	400KΩ	0Ω	26Ω	140Ω
6	25L6GT	INF.	38Ω	300KΩ	300KΩ	470KΩ	INF.	26Ω	140Ω
7	25Z6GT	INF.	50Ω	130Ω	300KΩ	130Ω	0Ω	38Ω	300KΩ

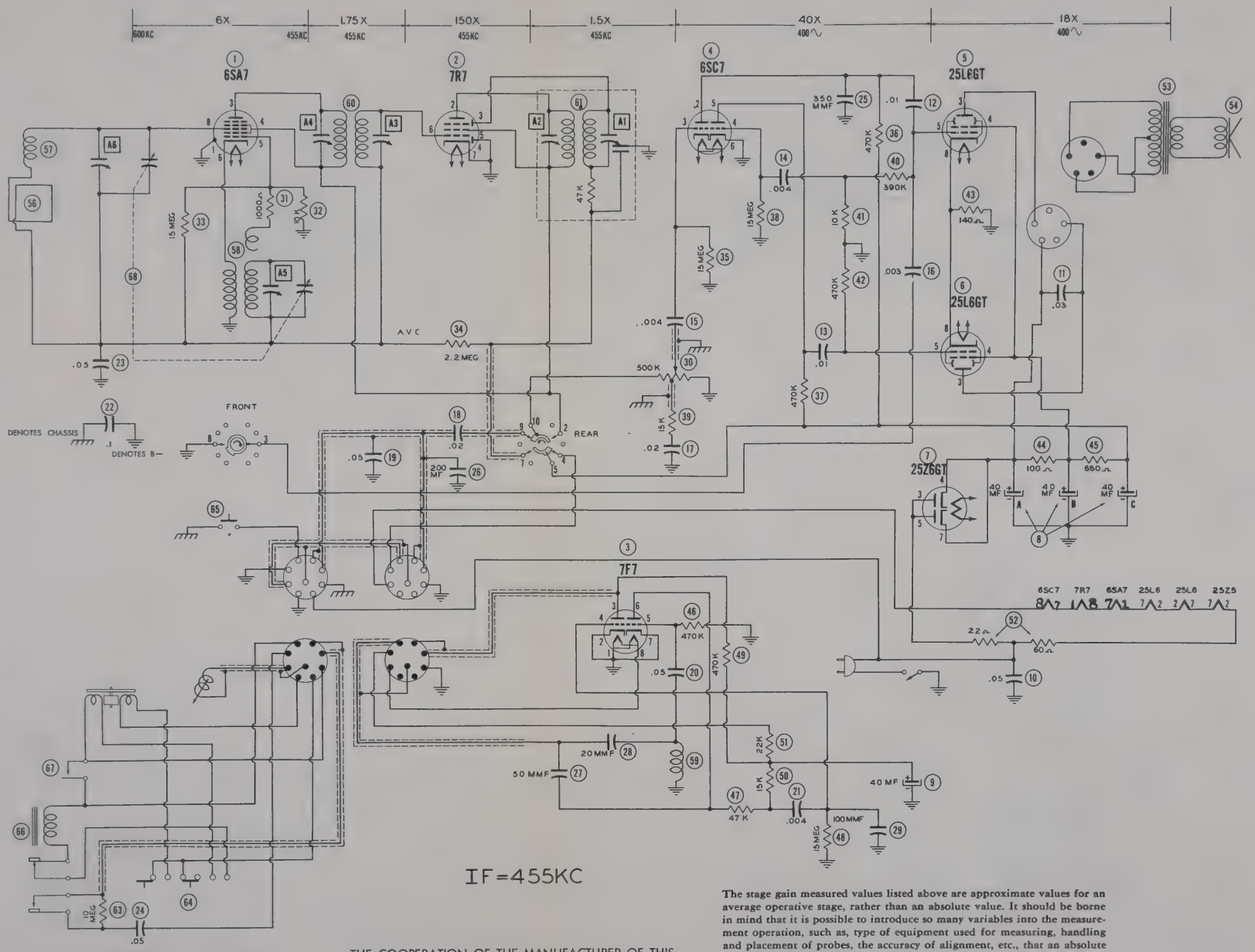
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DISASSEMBLY INSTRUCTIONS

1. Remove ten wood screws holding panel on bottom of cabinet.
2. Disconnect phono-oscillator plug. Remove panel from bottom of cabinet.
3. Remove two hex nuts holding phono-oscillator to panel. Remove oscillator from panel.
4. Remove three Phillips head wood screws holding metal panel over rear of chassis. Remove panel from cabinet.
5. Remove loop antenna plugs from chassis. Remove staples holding loop in cabinet. Remove loop from cabinet.
6. Disconnect phono-motor and phono-pickup plug.
7. Remove four Phillips head wood screws from metal plate that covers phono-oscillator. Remove metal plate from cabinet. This must be done before power cord can be removed with chassis.
8. Remove four Phillips head screws, two from each side of cabinet, holding chassis in cabinet. Pull on handle and chassis will slide out front of cabinet.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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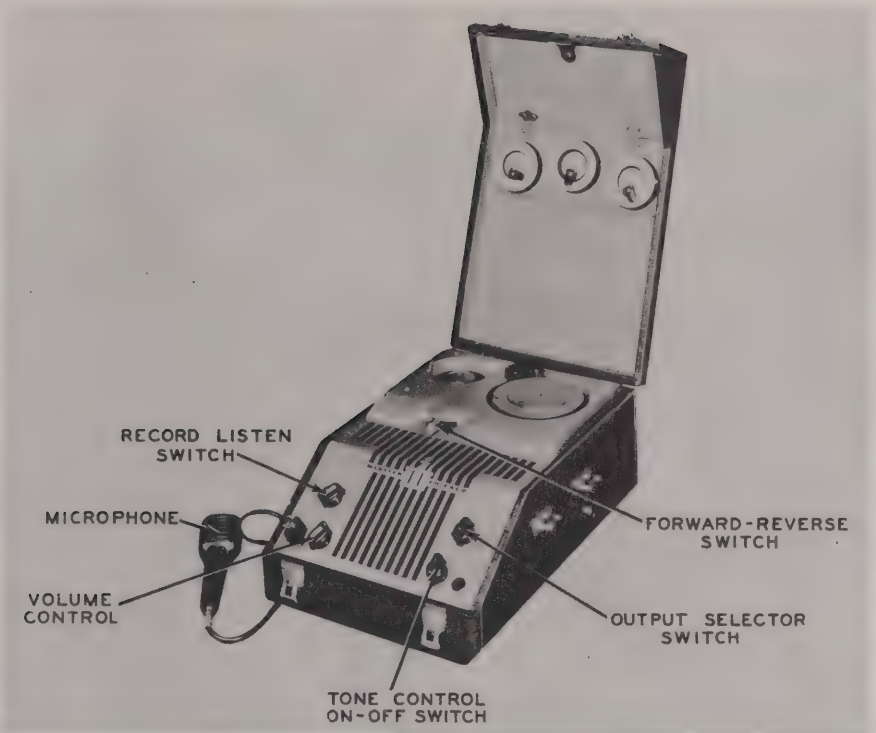
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



WEBSTER
MODELS 79, 80

GENERAL INFORMATION

Model 79

The Webster Model 79 consists of the wire handling mechanism alone, plus a special oscillator coil. The user may thus incorporate his own favorite amplifier design. One fifteen-minute spool of recording wire is supplied with the Model 79. Additional spools for fifteen-minute, half-hour, and hour recordings may be obtained as accessories. The microphone supplied with the Model 80 is also available as an accessory for the Model 79.

Model 80

The Webster Model 80 is a complete portable wire recorder and playback unit, including wire handling mechanism, oscillator, amplifier, and speaker. Provision is made for using an external speaker, or amplifier-speaker combination, if desired. Input connections are provided for a microphone, or for a high level input, such as a radio or a crystal phonograph pickup. Accessories include power cord, microphone, and three spools of recording wire.

Introduction

The technique of recording sound magnetically on a moving wire or tape was originated in 1896 by the Danish physicist Valdemar Poulsen. Although his work was successful, various difficulties with technique and magnetic materials prevented the widespread adoption of the method.

Since the initial magnetization curve of iron is far from straight, attempts to record without some means of "bias" result in a very high degree of distortion. Formerly, this bias was achieved by using a unidirectional (DC) field to saturate the wire before it reached the recording head. The recording head then decreased this magnetization in varying degrees in accordance with the signal. This method of recording resulted in a high noise level, and unless extremely great care were used in adjustment, the distortion was high.

The Webster wire recorder uses a high frequency "bias" mixed with the audio signal instead of the unidirectional field. This has the advantage of giving low noise level and low distortion. The high frequency used is in the vicinity of 40 kilocycles. This same high frequency is used at a much higher level to erase undesired recordings, leaving the wire magnetically neutral before the new recording is made.

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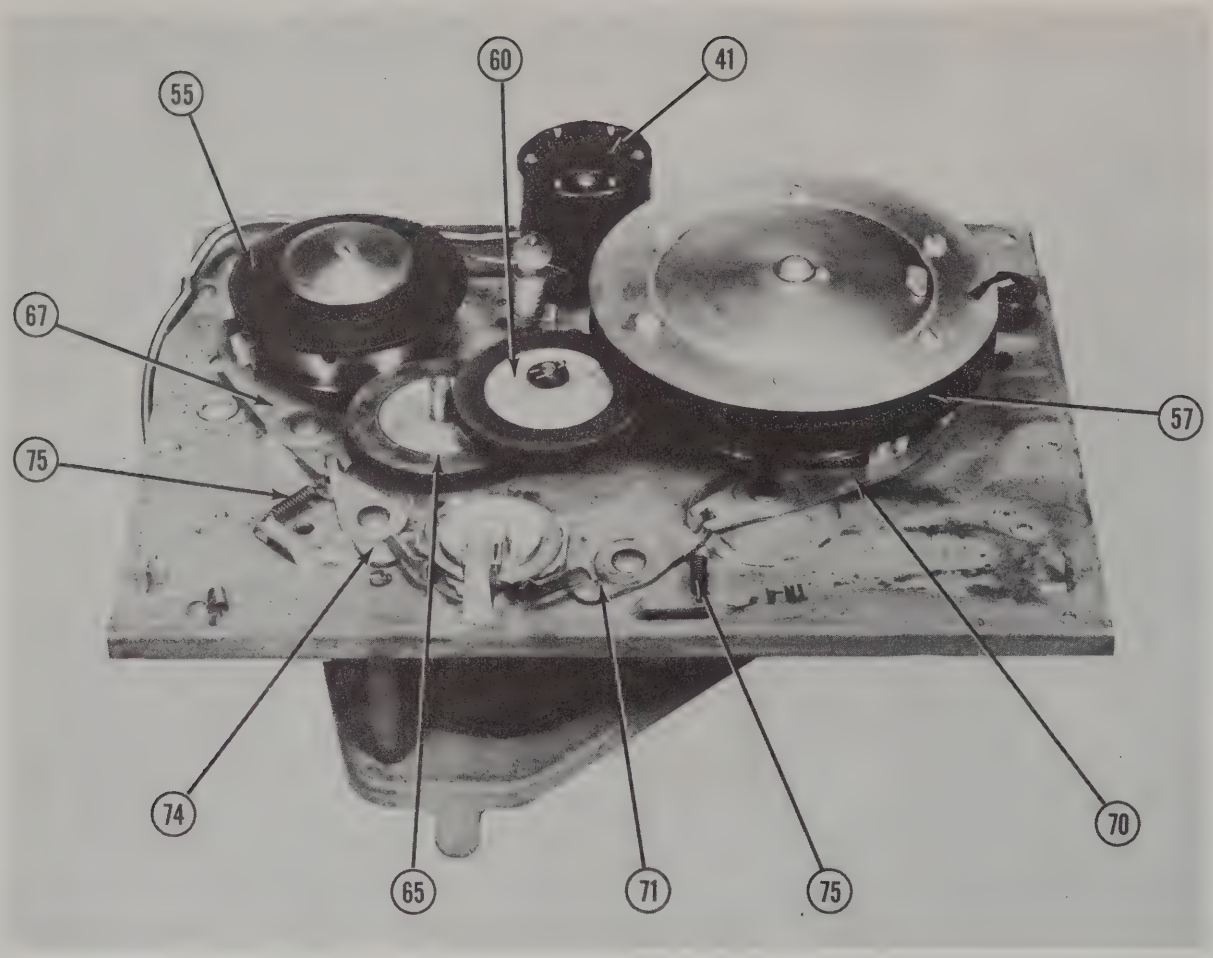
DATE 4/48-#487-26 SET #37 FOLDER #26



TOP VIEW—DRIVE MECHANISM LESS COVER PLATE

OPERATION

Making a Recording

Before operating the Webster Wire Recorder, be sure that the shipping screws have been removed. Remove the top cover assembly (43) and two red-headed machine screws will be found holding the motor rigid. These screws should be removed. If the recorder is to be reshipped these screws must be replaced; however, they are not required for normal carrying or traveling. After removing the shipping screws the top cover assembly should be replaced before the recorder is operated.

1. Place a spool of wire on the supply chuck (55). The spool should be placed label-side up so that the wire will feed from the rear of the spool.

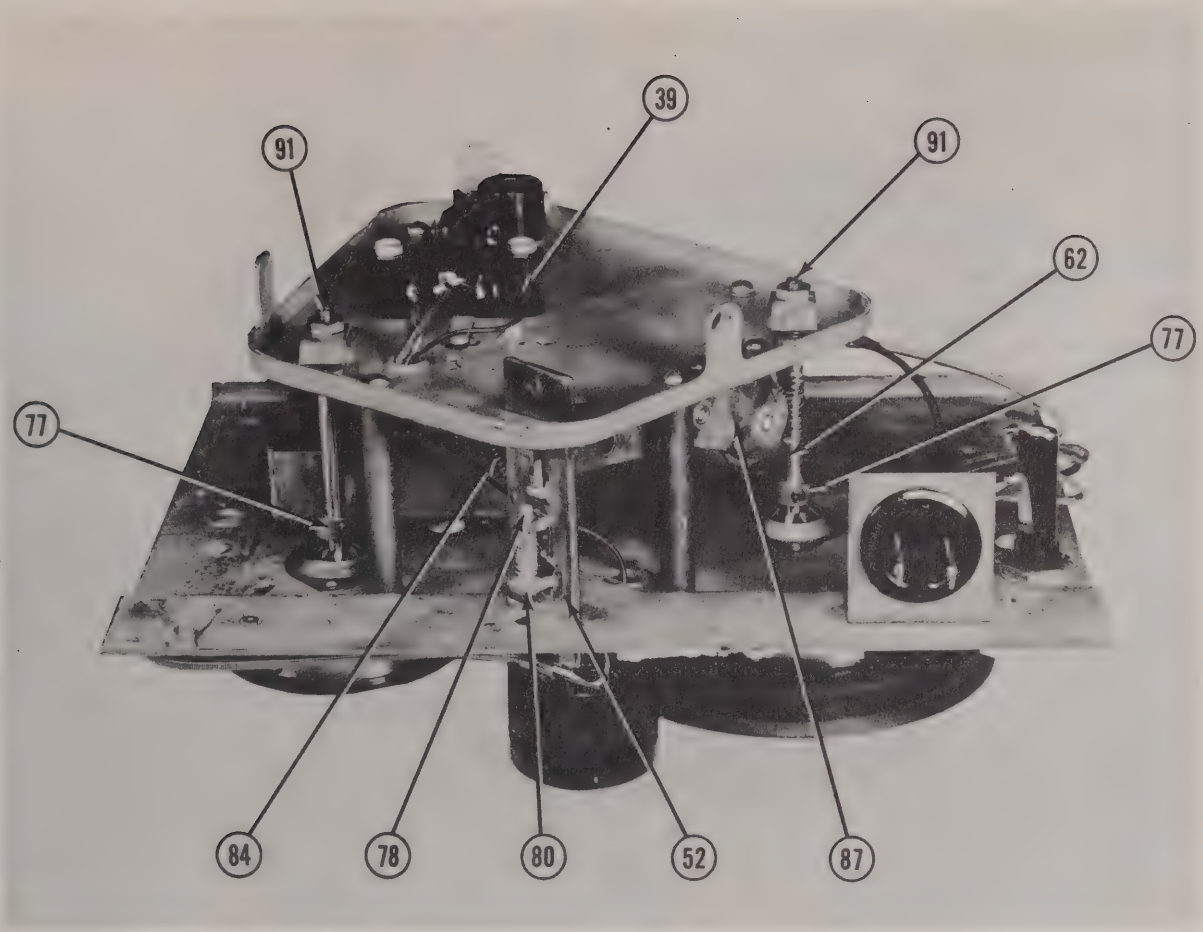
2. Rotate the take-up spool (57) by hand until the recording head (41) reaches the top of its vertical travel.

3. Pull the loose end of the wire past the recording head, through the groove in the take-up spool cover (49), and under the clip on this cover with a little to spare. The clip may be loosened to permit the wire to slip under it by pressing on the button in the center of the take-up spool cover.

4. The "Record-Listen" switch should be in "RECORD" position. Press down the control lever limiting button and move the control lever to "RUN" position. The limiting buttons are provided to prevent moving the control lever past "STOP" position when moving from either "RUN" or "REWIND" position. The brakes are arranged so that a heavy brake is applied to the trailing spool when the control lever is moved to "STOP" position. This prevents wire spilling, which would otherwise occur due to the inertia of the spools. If the control lever is moved past the "STOP" position, the wire is almost certain to spill since the brake will be removed, allowing the spool to spin freely.

Some experimenting should be done in order to get the best results from the Webster wire recorder. These experiments entail no expense, since the wire may be erased and used over and over. The process of making a recording automatically erases any previous program.

When using the microphone for the first time in making a recording, a trial setting of the volume control to about a "two-o'clock" position is suggested. If the volume control setting during "record" is too low, the background noise will be unduly high during "listen." A volume control setting too high while record-



REAR VIEW—DRIVE MECHANISM

ing will cause distortion, just as will an attempt to get too much output from a radio receiver. Also, it is possible, with the volume control turned full on, to saturate the wire to such an extent that it cannot be erased by ordinary means. If this should happen, the wire can be cleaned by using a "wire conditioner," which is a small but powerful magnet, which may be attached to the recording head to erase wire passing it in either direction.

After the recording is completed, the control lever should be moved to "STOP," then to "REWIND." The wire speed during rewind is about seven times the speed in the forward direction. It is not necessary to rewind the spool completely if an immediate playback is to be made. The pilot light is placed in such a position as to make it easy to watch the wire on the take-up spool and the control lever may be moved to "STOP" before the wire is completely rewound. If the wire is allowed to run completely off the take-up spool, the tension of the clip will cause the last turn to tuck into the supply spool and prevent unraveling.

Playback

For playback, the wire is threaded exactly as for recording. The "Record-Listen" switch is turned to "Listen." The volume and tone controls may be adjusted to suit the listener. Playing a magnetic recording has no effect on the record, so a record can be played thousands of times with no appreciable effect on its volume or quality. On the other hand, since the process of recording makes no mechanical change in the wire, a given wire can be erased and used over for new recordings as often as desired.

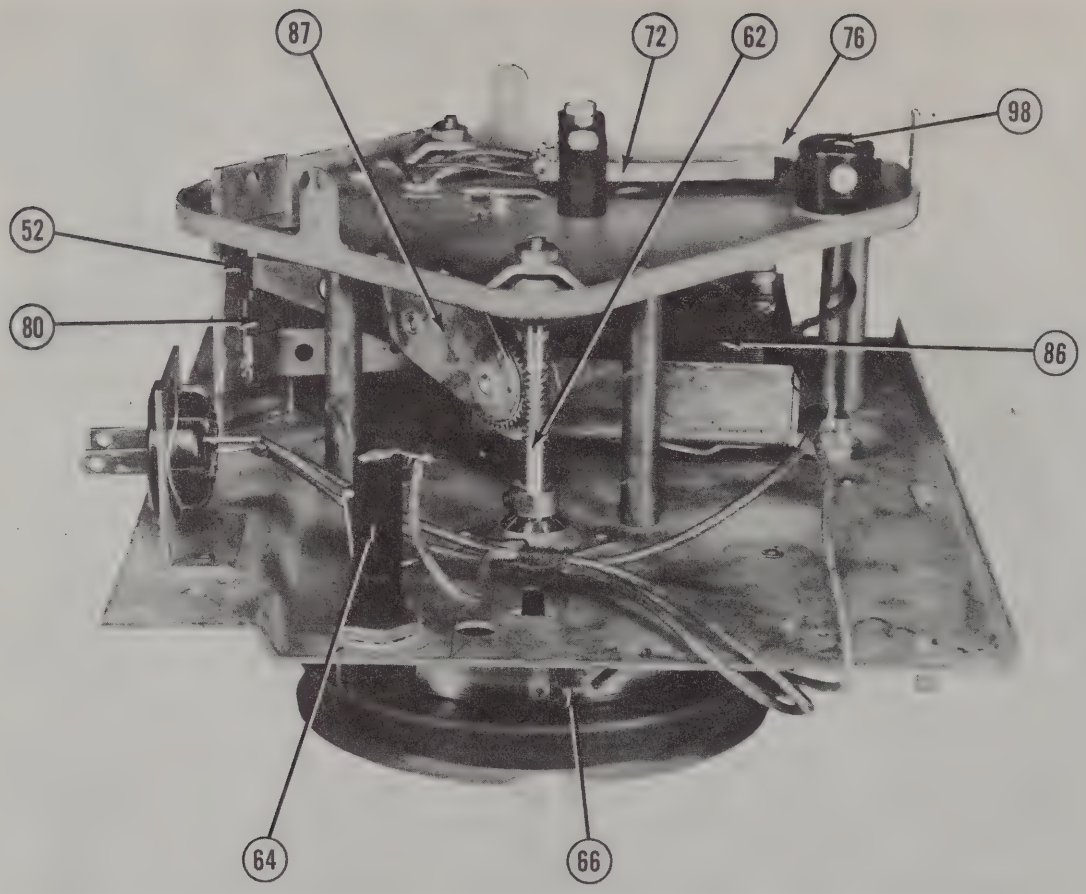
Erase

If it becomes desirable to erase a record without at the same time placing a new record on the wire, the wire may be run through in the "RUN" direction with the volume control turned to minimum and the "Record-Listen" switch in "Record" position. It is impossible to accidentally erase a record in the "REWIND" position, since contacts (72) and (94) automatically open the erase circuit except in "RUN" position.

With practice, it should be possible to erase a given word or phrase from a recording, and even to substitute other words for those erased.

Output Switch

A three-position switch is provided for selecting the type output desired. In position 1, the internal amplifier and speaker are used making the Model 80 a com-



SIDE VIEW—DRIVE MECHANISM

pletely self-contained recorder and playback unit. In position 2, the internal speaker is disconnected and the output transformer leads are made available through the two-contact output socket. In position 3, the internal amplifier is disconnected and the output of the preamplifier is brought to the output socket. This makes it possible to use any desired audio system for playback. With the output switch in position 3, it is possible to monitor the amplifier during "Record." A vacuum tube voltmeter connected to the output socket should read a maximum of 7 volts during record for best results in recording. Later production of the Model 80 uses a neon tube indicator for monitoring purposes.

Power Source

The Webster wire recorder is designed to operate on 110 volts, 60-cycle current, at a power rating of 65 watts. It may be used with a 50-cycle supply provided that recording and playback are made at the same frequency. With 50-cycle supply, the fidelity will be somewhat impaired since the wire speed will be only 17% of normal. Never attempt to operate this recorder from a DC source, or from a frequency other than 50-60 cycles.

The motor used is a four-pole shaded pole induction motor of the same type as used in automatic record changers.

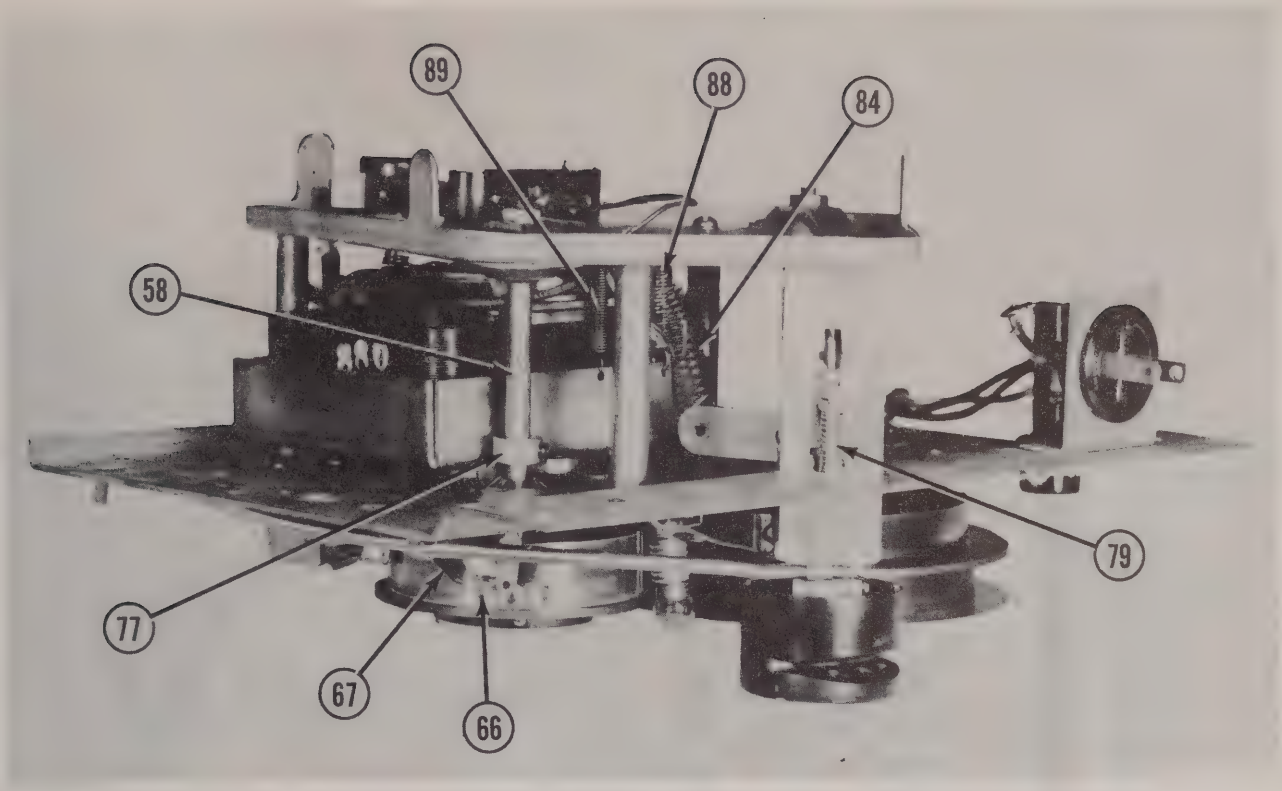
ADJUSTMENTS

While gauge measurements will be given for various adjustments, it is possible to make these adjustments without gauges if careful attention is paid to the operation of the mechanism. The use of gauges is recommended when possible since they will simplify the work and save much time.

Ordinarily adjustments will be required only if parts are replaced or if specific troubles indicate misadjustment.

Spools and Head

The height of the take-up and supply spools is adjusted by loosening the lock nuts (92) and turning the set screws (91). In early models, these adjustments must be made after the mechanism has been installed in the cabinet, since the mechanism is usually warped to some extent when fastened to the cabinet. This warping will not affect the operation except to change the height of the spools. Holes are provided in the bottom of the cabinet to facilitate making the final adjustments. A preliminary adjustment should be made before the mechanism is installed, since the height of the head is not adjustable in the cabinet. On later models, having a rigid frame the complete adjustment may be made



SIDE REAR VIEW—DRIVE MECHANISM

with the mechanism out of the cabinet. The take-up spool (57) should be adjusted first. The upper edge of the lower flange of this spool should be adjusted flush, or not more than 1/32" above the flange of the top cover assembly (43). If the adjustment is too high, it is possible for the wire to pass under the flange and pile up on the underside of the spool. If the adjustment is too low, the wire will not wind all the way to the flange and a tangle could result.

The recording head should next be adjusted to level wind the wire on to the take-up spool. This adjustment is made by means of the spring-loaded adjustment screw (78) on the slide and socket assembly (52). Improper adjustment is indicated by a tendency for the wire to pile up at one end of the spool.

After the take-up spool and the head have been adjusted, the supply spool (55) should be adjusted so that the head will level wind the wire properly on it during "REWIND." The collars (77) should fit over the slots in the shafts and should not touch the bearings; they should always allow some end play in the shafts.

Brakes

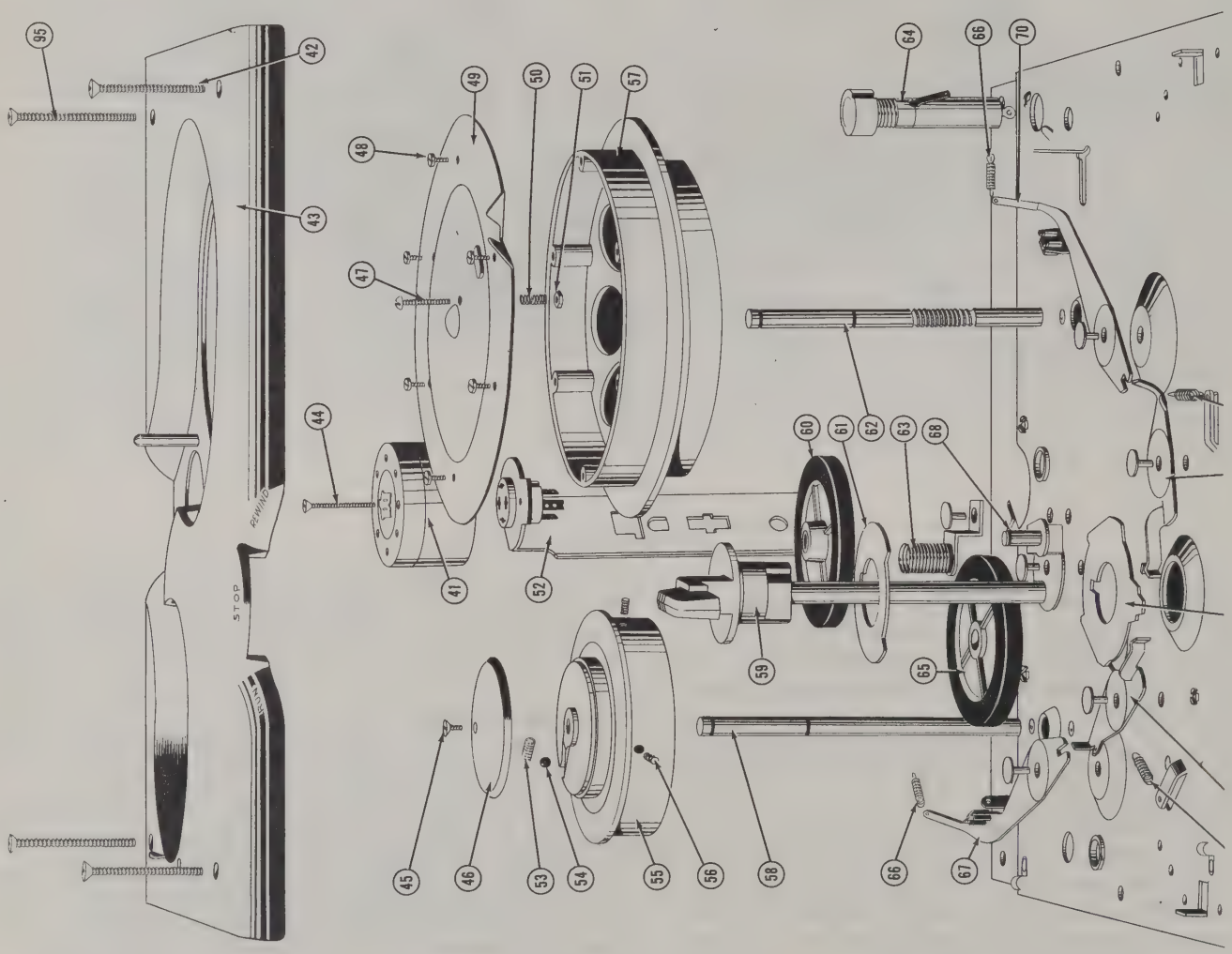
With the power off, move the motor control lever (59) to "REWIND," and force it slightly beyond its normal position. In this position, both brakes should be released and the spools should be free to spin. Check also by moving past the "RUN" position in the same way.

Supply Spool Brake

When the motor control is moved from "STOP" to its normal "RUN" position, a light brake should be applied to the supply spool (55). The brake tension should be such that a pull of ½ to ⅝ ounces is required to pull wire from a nearly empty spool. In this position, the upright flange of the left brake lever (74) should be approximately centered in the slot of the left brake shoe assembly (67). Adjustment may be made, if necessary, by bending the brake lever (74). Assuming that the brake lever is not touching the brake shoe assembly, improper brake pressure may be remedied by bending the base plate lug to which the tension spring (66) is attached.

The purpose of this brake is to prevent spilling of the wire, which would happen if the supply spool should run faster than the take-up spool. Insufficient tension on the brake would be indicated by a tendency for the wire to "spill" in "RUN" position. Too much tension may cause the motor to run slowly and unevenly resulting in poor recordings.

Continued on page eleven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REWIND
STOP
RUN

A PHOTOFACT "EXPLODED" VIEW
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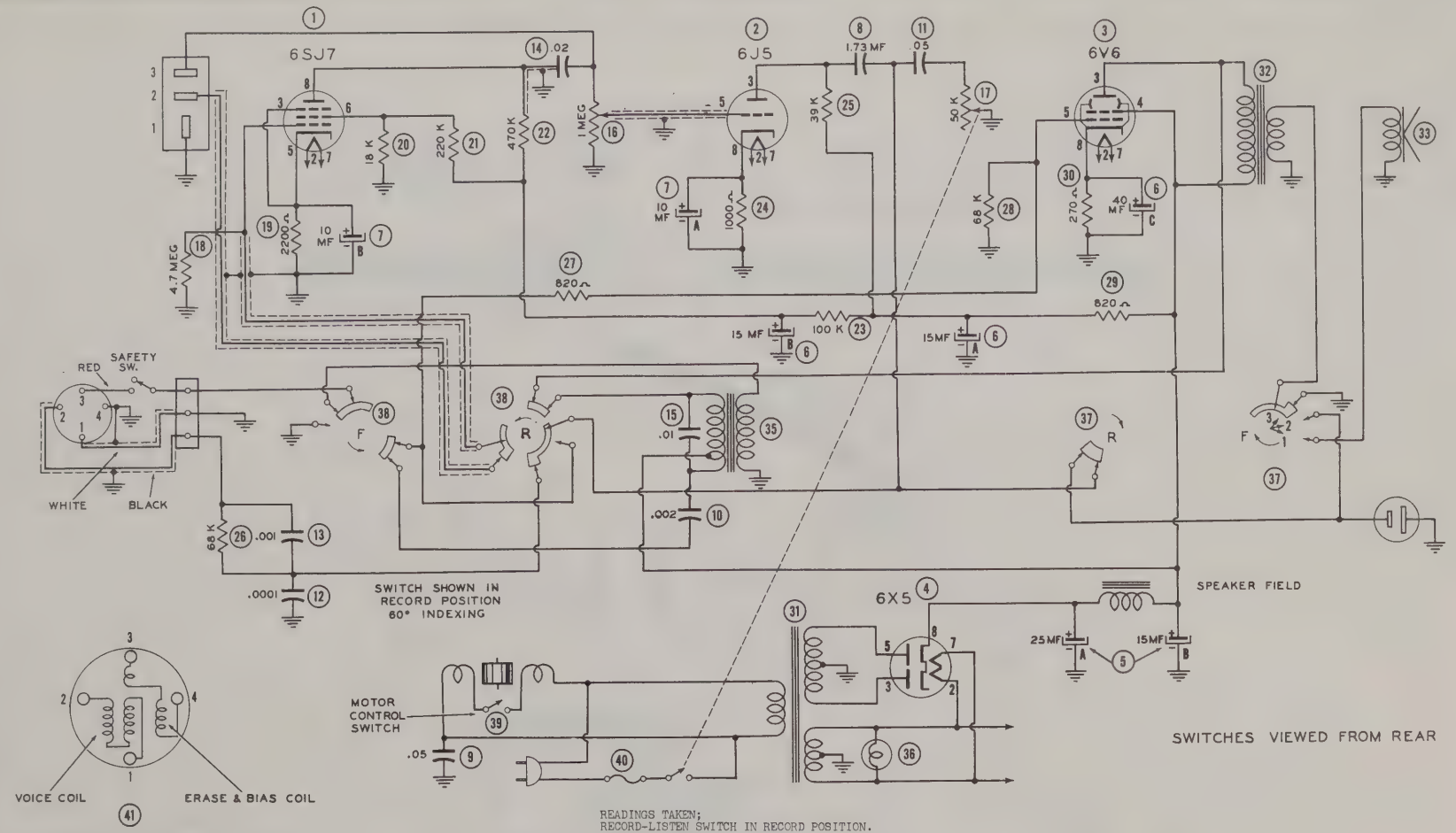

READINGS TAKEN;
RECORD-LISTEN SWITCH IN RECORD POSITION.
OUTPUT SWITCH IN #1 POSITION.
RECORDER VOICE COIL CONNECTED.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	3VAC	.3VDC	-.1VDC	.3VDC	17VDC	3VAC	160VDC
2	6J5	0V.	3VAC	160VDC	225VDC	0V.	340VDC	3VAC	5VDC
3	6V6GT	0V.	3VAC	340VDC	340VDC	-20VDC	-20VDC	3VAC	12VDC
4	6X5GT	0V.	3VAC	300VAC	0V.	300VAC	0V.	3VAC	390VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	.1Ω	2.2KΩ	4.7 Meg.	2.2KΩ	18KΩ	.1Ω	740KΩ
2	6J5	0Ω	.1Ω	210KΩ	270KΩ	1 Meg.	170KΩ	.1Ω	1KΩ
3	6V6GT	0Ω	.1Ω	170KΩ	170KΩ	68KΩ	68KΩ	.1Ω	270Ω
4	6X5GT	0Ω	.1Ω	170Ω	INF.	185Ω	INF.	.1Ω	170KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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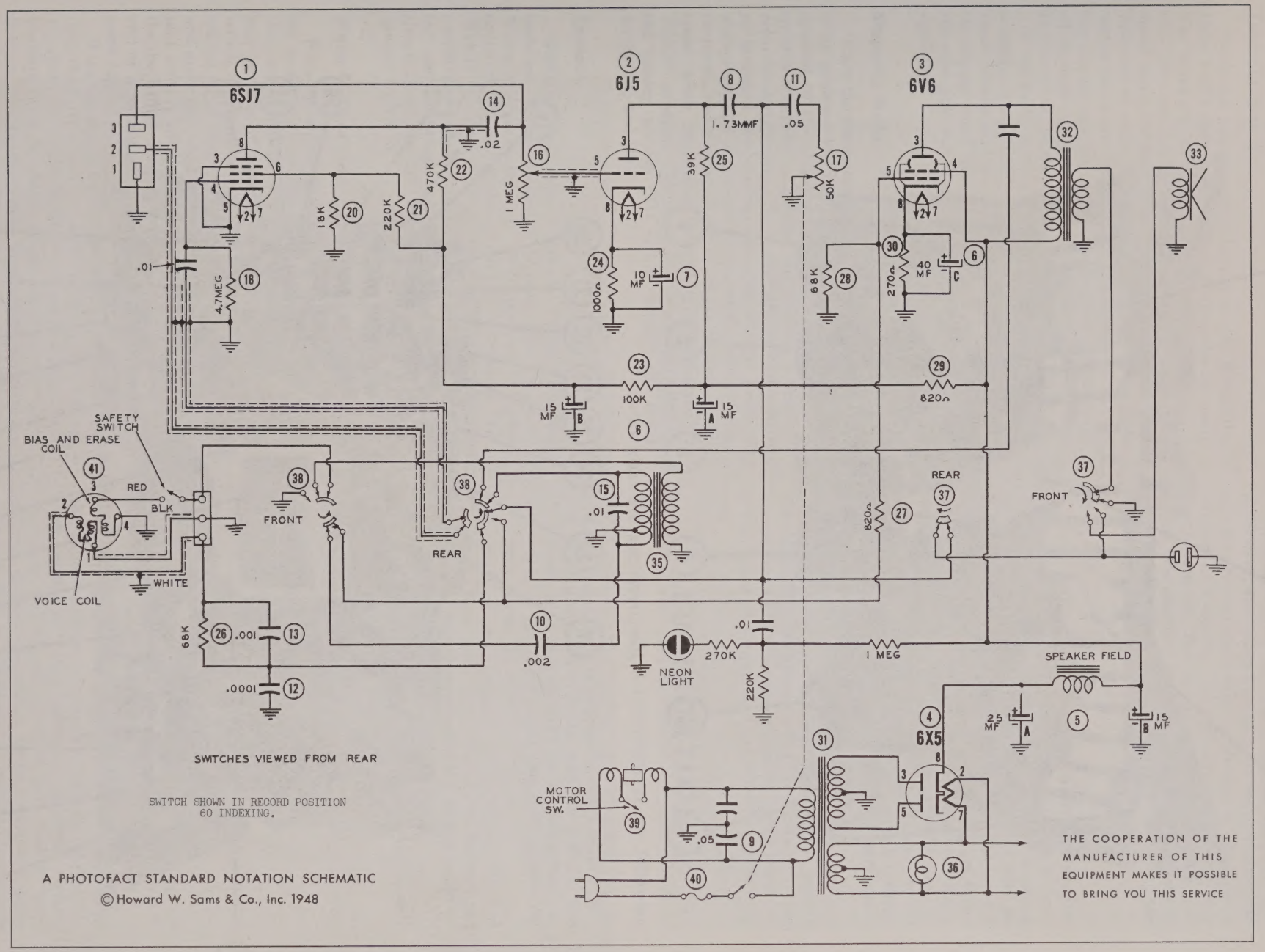
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE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6J5
6V6
6X5
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.05
.02
.01
4.7MEG
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220K
470K
1 MEG
39K
50K
68K
10 MF
1000Ω
270Ω
40 MF
100K
15 MF
820Ω
.01
.001
.0001
.002
270K
220K
1 MEG
25 MF
SPEAKER FIELD
SAFETY SWITCH
BIAS AND ERASE COIL
RED
BLK
WHITE
VOICE COIL
FRONT
REAR
NEON LIGHT
MOTOR CONTROL SW.
SWITCHES VIEWED FROM REAR
SWITCH SHOWN IN RECORD POSITION 60 INDEXING.
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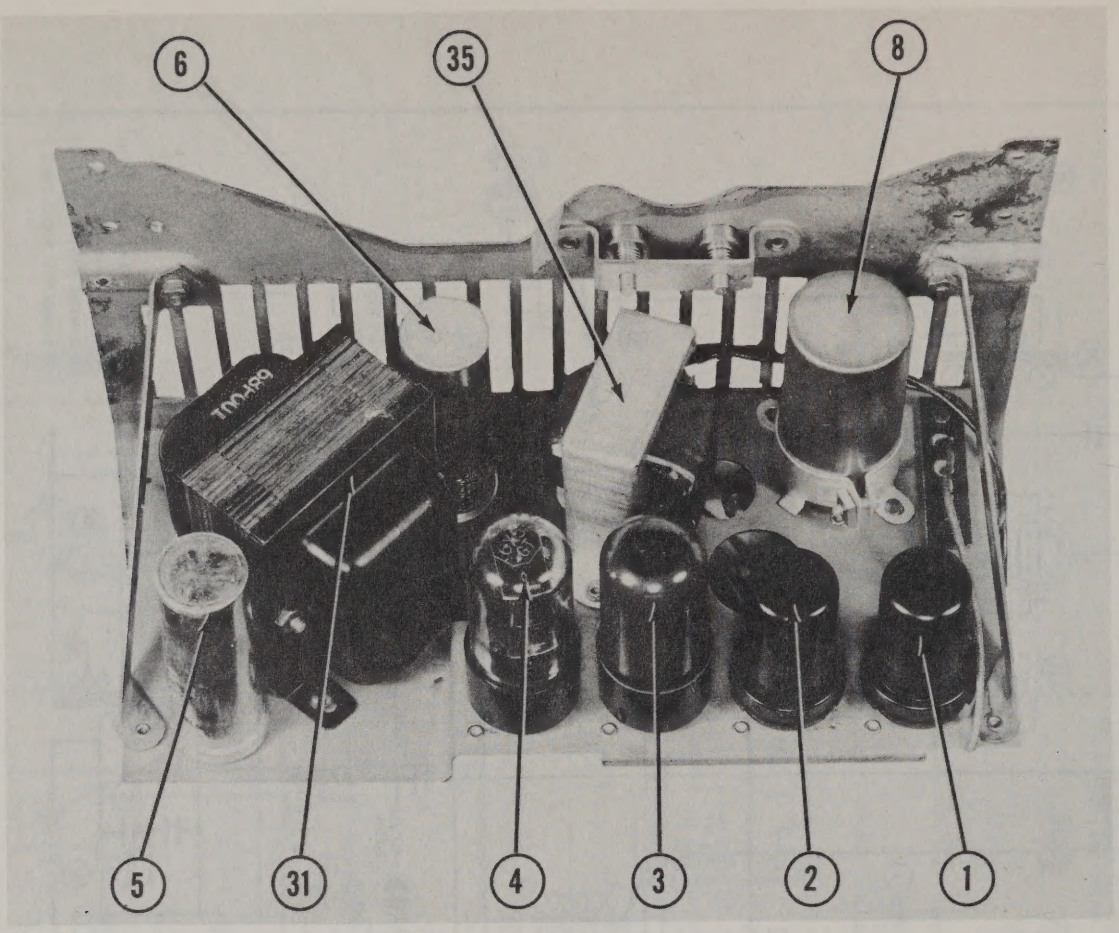
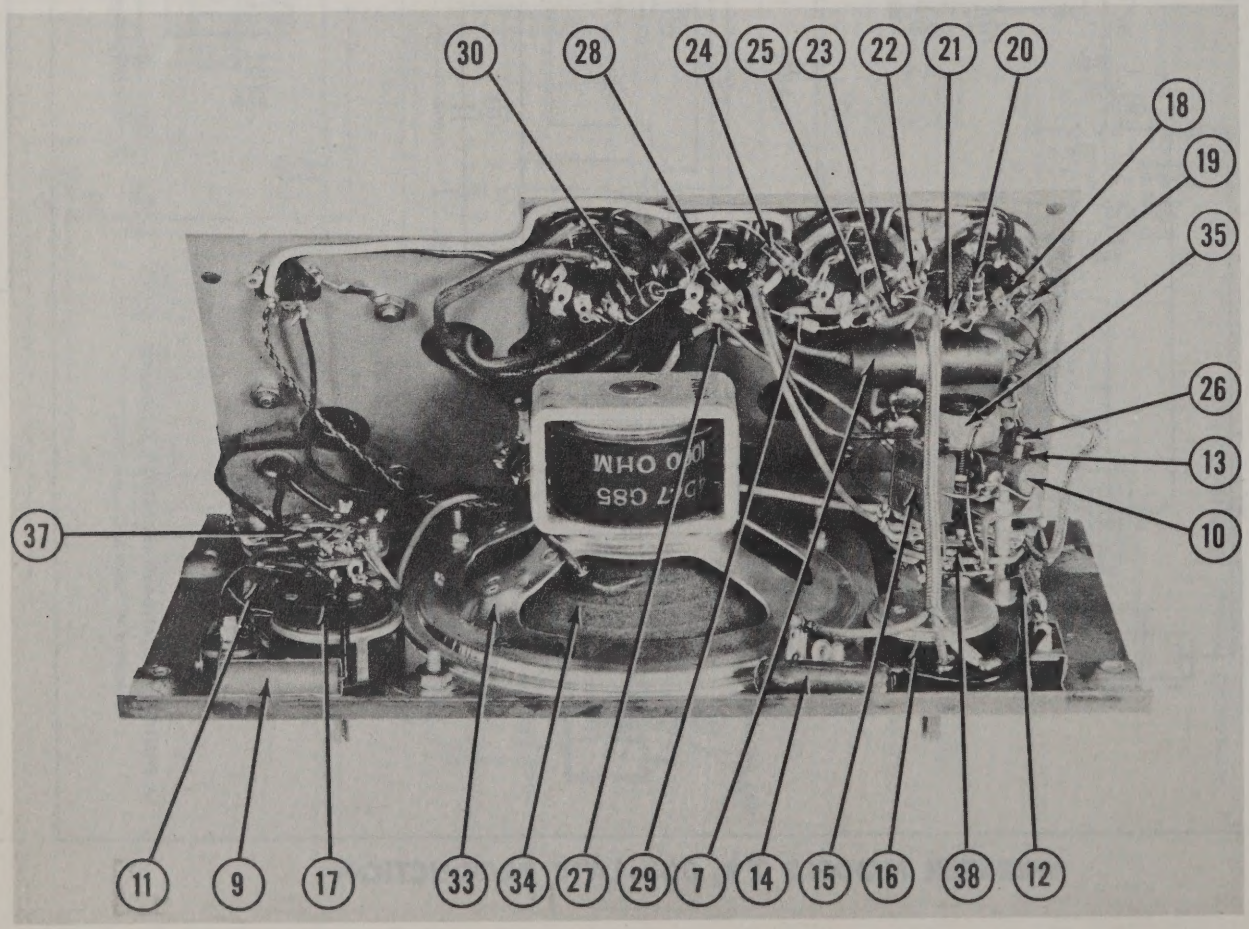


AMPLIFIER CHASSIS—TOP VIEW



AMPLIFIER CHASSIS—BOTTOM VIEW

Take-Up Spool Brake

With the motor control moved to "REWIND," a light brake should be applied to the take-up spool. The brake tension should be such that a pull of 5/16 to 7/16 ounce is required to pull wire from the take-up spool when the head is on its downward stroke. Adjustment is made by bending the base plate lug to which the tension spring (66) is attached. Before making this adjustment, check to see that the upright flange of the right brake lever (71) is approximately centered in the slot of the right brake shoe assembly (70).

If the brake tension is too light, the wire may have a tendency to "spill" in "REWIND" position. Too much tension will cause the wire to wind so tightly on the supply spool that "tucking" will not occur when the wire pulls out of the clip at the end of the rewind operation.

Stopping Brakes

When the motor control is moved from either operating position to "STOP," a heavy brake should be applied to the trailing spool. This stops the wire quickly and prevents spilling when power is removed from the driven spool. The brake cams (61 and 73) are so arranged that during operation a light brake is always applied to the spool from which wire is being removed, and a heavy brake is always applied to this spool when the motor control lever is moved to "STOP" position. The heavy brakes are controlled by the tension springs (75) acting through the brake levers (71) and (74).

Contacts

With the motor control lever in "STOP" position, both sets of contacts should be open 1/32" to 1/16". When the lever is moved to "RUN" position, the motor contacts (72 and 76) should be first to close. In "REWIND" position, the erase contacts (72 and 94) should remain open. Adjustments may be made by bending the contact springs. A pull of approximately 36 oz. should be required to pull the motor contact (76) into contact with (72).

Motor Drive Tension

With the motor control lever in "RUN" position, the motor shaft should press against the idler wheel (60) with a tension of from 7 to 9 oz. This adjustment may be made by bending the lug on the motor plate to which the tension spring (85) is attached. Unless a special tool is used, it is necessary to remove the motor and make this adjustment by trial and error. A simple tool for adjusting this tension without disassembling the mechanism may be made by filing a slot near the end of a rectangular metal bar to fit over the adjustment lug.

With the motor control lever in "REWIND" position, the drive wheel (65) should press against the supply spool (55) with a tension of from 2 to 3 oz. In this position there should be no tendency toward "motor bounce." Adjustment may be made by bending the sub-base lug to which the tension spring (89) is attached.

Cam and Rocker Arm Assembly

The small end of the rocker arm (87) should be centered in the slot of the slide (52). At the same time, the cam gear should engage the worm with an appreciable amount of backlash, and the cam itself should not touch the worm. The mounting holes for the cam and rocker arm assembly are made large enough to permit adjustment in any direction merely by loosening the mounting screws.

Wire Clip

The wire clip on the take-up spool cover (49) is provided to give a little "jerk" as the last turn of wire leaves the spool during "REWIND." This jerk causes the last turn to tuck into the lower layers of wire on the supply spool and prevent unravelling. If the spring tension on the clip is too weak, this tucking will not take place. Too much tension may cause consistent breaking of the wire at the end of the rewind operation. Occasional breaking at the clip is normal, due to kinking near the end of the wire. Since only a fraction of a second of recording time is lost with each break, no harm is done.

The tension of the clip is adjusted by turning nut (51). For this purpose it will be necessary to remove the cover (49). The tension should be adjusted so that a pressure of 17 oz. is required on the center button to allow a piece of wire to slip freely from under the clip.

LUBRICATION

Use a grease, such as Lubriplate, at the following points:

1. Sliding surfaces of slide and socket assembly (52).
2. Sliding surfaces of brake cams (61 and 73) and motor control lever (59). Be sure to grease the edges of the cams where they rub against the brake levers (71 and 73).
3. Pivots of brake control levers (71 and 73), and brake shoe assemblies (67 and 70). Do not use grease in the slots of the brake shoe assemblies.
4. Under the idler lever assembly (68).
5. On the worm shaft (62) where it contacts the gear of the rocker and cam assembly (87).
6. On the outside edge of the cam (87).
7. On the rubbing surfaces of the switch cam (98).

Use light oil at the following points:

1. Idler (60) bearing on felt washer.
2. On the self-aligning bearings of shafts (58 and 62).
3. Motor bearings.
4. If new brake shoe assemblies (67 and 70) are installed, apply one drop of light oil to each felt. Otherwise do not oil these felts.

Be very careful not to allow oil or grease to touch the rubber surfaces of the drive wheel (65) or the idler wheel (60). Any lubricant on these surfaces should be immediately removed with carbon tetrachloride. Excess lubricant on the brake felts will cause an oily surface on the supply or take-up spools. Such oil should be removed with carbon tetrachloride.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1		Preamplifier—6SJ7
2		Audio amplifier—6J5
3		Oscillator and audio output—6V6GT
4		Rectifier—6X5GT
5	30P049	Filter capacitor—25-15 mfd. @ 450-350 volts
6	30P050	Filter capacitor—15-15-40 mfd. @ 350-250-25 volts
7	30P051	Cathode bypass—10-10 mfd. @ 25-25 volts
8	30P039	Audio coupling—1.73 mfd. @ 220 VAC
9		Line bypass—.05 mfd. @ 400 V.
10		Oscillator grid—.002 mfd. @ 600 V.
11		Audio coupling—.05 mfd. @ 400 V.
12		Tone compensation—.0001 mfd. @ 400 V.
13		Tone compensation—.001 mfd. @ 600 V.
14		Audio coupling—.02 mfd. @ 400 V.
15		Fixed trimmer—10,000 mmf. @ 300 V.
16		Volume control—1 megohm
17		Tone control—50,000 ohms
18		Preamplifier grid—4.7 megohms
19		Preamplifier cathode—2200 ohms
20		Preamplifier screen bleeder—18K ohms
21		Preamplifier screen dropping—220K ohms
22		Preamplifier plate load—470K ohms
23		Preamplifier decoupling—100K ohms
24		A.F. cathode—1000 ohms
25		A.F. plate load—39K ohms
26		Tone compensation—68K ohms
27		Parasitic suppressor—820 ohms
28		Output grid—68K ohms
29		Filter—820 ohms
30		Output cathode—270 ohms
31	68P001	Power transformer
32	67P003	Output transformer to match 3.2 ohm speaker
33	76P018	Speaker
34		Speaker cone
35		Oscillator coil
36		Pilot light—type 50
37		Output channel selector switch
38		"Record-Listen" switch
39	49P060	Contact base
40		Fuse 1 amp.
41		11X180 record head assembly
42	26P281	No. 8-32 x 1⅞" Phillips Rec. O.H.M.S.
43	11X213	Top cover assembly
44	26P309	No. 3-48 x ⅞" O.H.M.S.
45	26P279	No. 5-40 x 3/16" O.H.M.S.
46	45P279	Chuck cap
47		No. 3-48 R.H.M.S.
48	26P278	No. 6-32 x ¼" B.H.S.T. screw
49	11X181	Take-up spool cover assembly
50	46P137	Compression spring
51	26P306	No. 3-48 x 3/16 x 1/16 hex nut
52	11X208	Slide and socket assembly
53	46P143	Compression spring
54	48P014	Steel ball 3/16" diameter
55	42P090	Chuck—wire supply spool
56	26P633	No. 8-32 x 3/16" Bristol socket set screw conepoint
57	42P091	Take-up spool
58	41P558	Shaft—wire supply spool
59	42X092	Control lever
60	11X003	Idler wheel assembly
61	45P495	Brake cam
62	47P029	Worm shaft
63	38P024	Pilot light receptacle
64	38P026	Fuse and extractor post
65	11X195	Drive wheel and tire assembly
66	46P130	Tension spring
67	11X183	Left brake shoe assembly
68	11X179	Idler wheel assembly
69	11X186	Base plate assembly
70	11X184	Rt. brake shoe assembly
71	45P521	Brake lever—right
72	11X176	M & O spring and crowned contact assembly
73	45P494	Brake release cam
74	45P522	Brake lever—left
75	46P131	Tension spring
76	11X177	Detent spring and contact assembly
77	41P557	Thrust collar
78	26P284	No. 6-32 x ⅞ fil. H.M.S.
79	46P135	Compression spring
80	45P544	Head adjustment bracket
81	25P360	Lockwasher
82	26P302	Lock nut
83	45P493	Yoke
84	46P132	Tension spring
85	46P133	Tension spring
86	15X0881	Motor assembly
87	11X172	Cam and rocker assembly
88	46P144	Tension spring
89	46P134	Tension spring
90	11X185	Sub-base assembly
91	41X591	Adj. screw and insert assembly
92	26P077	No. 10-32 x ⅜" x ⅛" hex nut
93	26P747	No. 8-32 x ¼" Sems H.H. slot I.T.
94	11X178	M & O spring and flat contact assembly
95	26P282	No. 8-32 x 2⅛ Phillips Rec. O.H.M.S.
96	26P248	No. 8-32 x ⅜" Sems H.H. slot I.T.
97	26P285	No. 8-32 x ⅞" hex hd. S.T. screw
98	49P059	Switch cam
99	26P079	No. 6-32 x ½" R.H.M.S.